ANNUAL INFORMATION SYSTEMS PLANNING REPORT

1984

INPUT

About INPUT

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs.

Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international planning services firm. Clients include over 100 of the world's largest and most technically advanced companies.

Offices

NORTH AMERICA

Headquarters
1943 Landings Drive
Mountain View, CA
94043
(415) 960-3990
Telex 171407

Detroit
220 East Huron
Suite 209
Ann Arbor, MI 48104
(313) 971-0667

New York
Park 80 Plaza West-1
Saddle Brook, NJ 07662
(201) 368-9471
Telex 134630

Washington, D.C.
11820 Parklawn Drive
Suite 201
Rockville, MD 20852
(301) 231-7350

/AUSTRALIA

eas Data Service
pany, Ltd.
tsu Building
2-7 Kita Aoyama
me Minato-ku
107

0-7090
6487

shisuto
uzumaru Bldg., 6th Floor
shi Shimbashi
ne Minato-ku
105, Japan
7-0654
81 26196

ore
vare Consultants (PTE) Ltd.
angkor
re Park
ore 1025
42

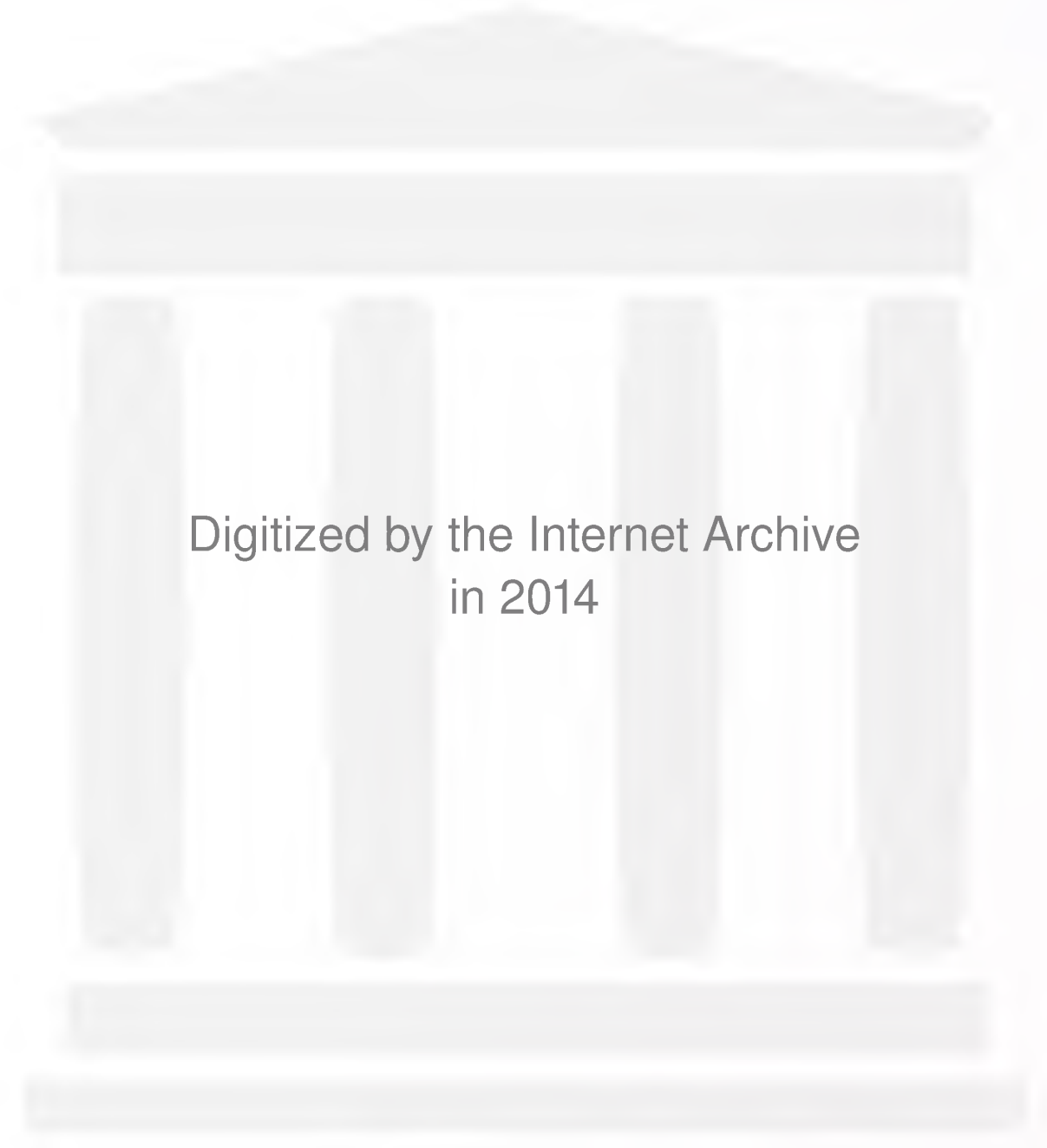
S-104 22 Stockholm
Sweden
08-52 07 20
Telex 17041

West Germany
NOVOTRON GmbH
Am Elizabethenbrunnen 1
D-6380 Bad Homburg
West Germany
Telex 418094

INPUT
Planning Services For Management

ANNUAL INFORMATION SYSTEMS PLANNING REPORT, 1984

JULY 1984



ANNUAL INFORMATION SYSTEMS PLANNING REPORT
1984

CONTENTS

ANNUAL INFORMATION SYSTEMS PLANNING REPORT
1984

EXHIBITS

1 INTRODUCTION

I INTRODUCTION

- This report is part of INPUT's Information Systems Program (ISP). It identifies strategic planning issues and trends for information systems. The object is to help information systems (IS) management make effective decisions regarding organization, hardware, software, systems, and procedures.

A. SCOPE AND METHODOLOGY

- The research of this report focuses on systems plans for companies in the following industries:

  - Discrete Manufacturing.
  - Process Manufacturing.
  - Transportation.
  - Medical.
  - Services.
  - Utilities.

- Distribution (Retail and Wholesale).

- Banking and Finance.

- Insurance.

- Government and Education.

- Analysis was performed by company size, where appropriate. The companies were categorized into the following three groups based on revenue, budget authority, or total assets:

  - Less than $250 million.

  - $250 million to $1 billion.

  - Over $1 billion.

- The research was based on over 250 interviews with IS organizations. Appendix A shows the distribution of these organizations by size and industry sector.

- Major vendors were also interviewed to determine product and service trends as well as to determine their perspective on the computer industry in the next five years. INPUT's extensive research base for its Information Services and Field Service programs was also used.

B. REPORT ORGANIZATION

- This report is organized as follows:
  - Chapter I is an introduction.
  - Chapter II is an executive summary formatted as a presentation for group discussions.
  - Chapter III is INPUT's analysis of IBM's system directions.
  - Chapter IV is a summary of annual survey finds on the following topics:
    - IS budgets.
    - IS planning issues.
    - IS applications development.
  - Chapter V is a summary of the annual survey finding for each industry sector. The topics are:
    - IS budgets.
    - IS planning issues.
    - IS applications development.
- There are three appendixes:
  - Appendix A shows the distribution of interviewed IS organizations by industry sector and size.
  - Appendix B is a copy of the Annual Survey Questionnaire.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- This executive summary is designed in a presentation format in order to:
  - Help the busy reader quickly review key research findings.
  - Provide an executive presentation and script that facilitates group communications.
- The key points of the entire report are summarized in Exhibits II-1 through II-8. On the left-hand page facing each exhibit is a script explaining the exhibit's contents.

A. I.S. SHOULD GET INTO THE SERVICE BUSINESS

- IS's objectives strongly focus on software issues. This has been the case for many years. But the environment in which IS operates is changing.

  - End users are becoming more involved with corporate computing.

  - Senior managers are beginning to be concerned about computing issues other than cost--especially data integrity and control.

  - Budgets in non-IS departments contain information processing expenditures.

  - IS budget growth is increasing again, but the main growth areas--mass storage devices and microcomputers--are produced by the quest to access corporate data.

- The visibility of corporate computing and the burgeoning demand for corporate data can be a golden opportunity for IS to be viewed as a strategically important organization. Improper action by IS can reinforce the perception of IS as an impediment to accomplishing corporate goals. To enhance its role in the organization, IS must:

  - Become a service organization.

  - Become an advisor to senior management on all aspects of corporate computerized information.

  - Become solution oriented. Remember, software is only a means to achieving business goals.

EXHIBIT II-1

I.S. SHOULD GET INTO THE SERVICE BUSINESS

- IS Software Objectives Are Receiving Too High a Priority

- IS Operating Environment Is Changing
  - End User More Involved
  - Senior Management Concerned with Noncost Issues
  - High Demand for Corporate Data

- IS Choice:
  - Strategically Important Organization
  - Impediment to Corporate Goals

B. SNA IS THE CAPSTONE OF IBM'S SOFTWARE STRATEGY

- IBM has had a flurry of activity in both the large mainframe and microcomputer markets. IBM also announced support of a version of UNIX for its personal computer. Although these announcements may seem to be disjointed, they do fit within IBM's software strategy. This strategy is represented by a pyramid, with SNA as its capstone.

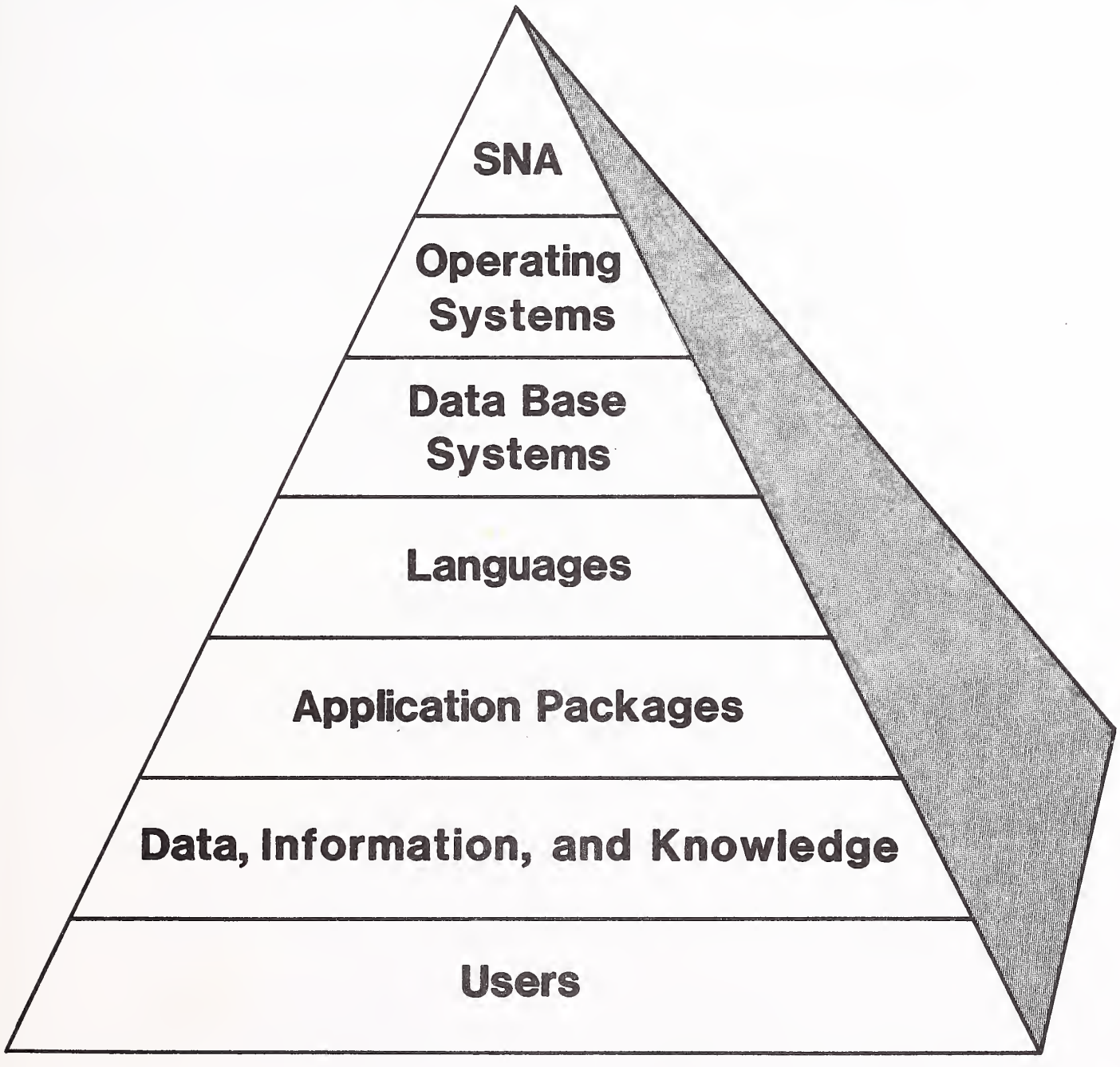
- SNA and the operating systems are interdependent. Even though the original plans for operating systems assumed that access methods were all that was necessary to construct any system, data base support was soon provided by CICS and IMS. Of course, data base systems required languages to access the system.

- Once a prototype of the top part of the pyramid had been built (using a top-down approach), work was begun to see how the system could be used to solve major problems. Thus, applications were addressed to run under this pyramidal structure. The demand for information and the advent of microcomputers put the power in the hands of the end users. End users didn't care about structure; they just wanted information they could manipulate. They began to create their own data base and soon realized they were recreating data that existed on corporate data bases, usually maintained under the SNA capstone.

- IBM's belated attention has fit into its strategy, creating a solid base for its software pyramid and minimizing the risk of the users inverting it. IBM believes end-user computing must conform to its own software structure, just as all other computing should.

EXHIBIT II-2

SNA IS THE CAPSTONE OF IBM'S SOFTWARE STRATEGY



C. I.S. BUDGETS ARE GROWING AT A FASTER RATE

- The budget distribution for IS departments is similar to the distribution during previous years. Communications is continuing to increase its share of the budget. Hardware, however, has remained the major nonpersonnel use of IS funds, a significant portion of which is being spent on mass storage devices.

- The growth rate for IS budgets is beginning to accelerate.

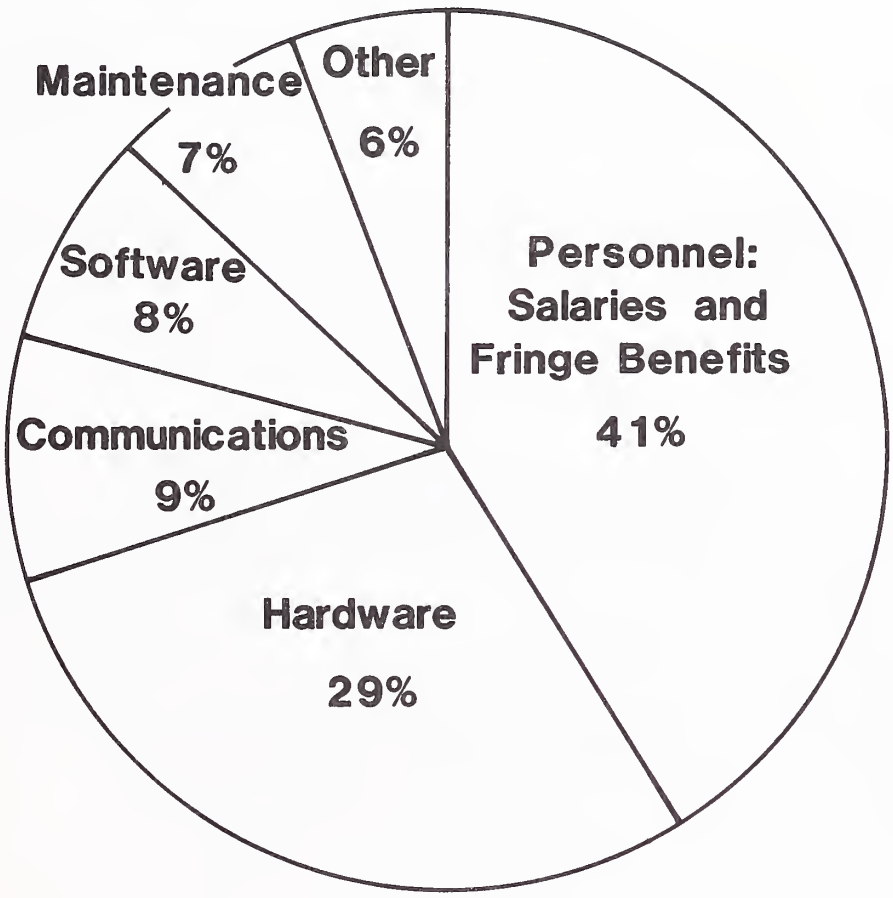
  - The largest growth areas are mass storage devices, microcomputers, and minicomputers. This growth reflects the high demand for corporate data and the anticipation of moving data between central and local processors.

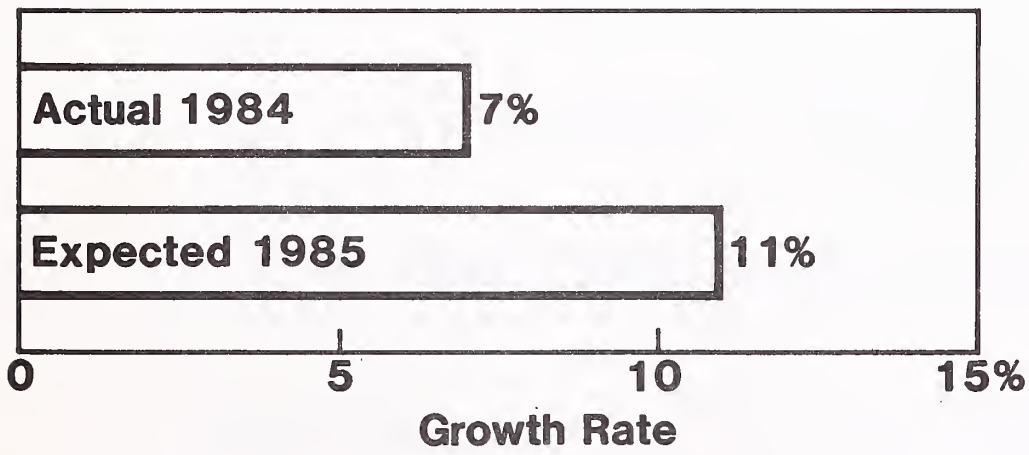
  - Custom programming and terminal expenses are expected to decrease. IS managers are still trying to reduce their use of contract programmers, and the planned reduction in terminals could be due to using microcomputers instead.

- The budget growth does not reflect the growth of computing expenses in user departments. These expenses still are not controlled centrally within most organizations, but senior management is becoming more aware of this problem. IS could again become the clearing house for all computer expenses.

EXHIBIT II-3

I.S. BUDGETS ARE GROWING AT A FASTER RATE





D. SENIOR MANAGEMENT CONCERNS ARE SHIFTING AWAY FROM COST

- In the past, senior managers have been concerned only with IS cost. They believed that IS was required but always cost too much. Since these managers are judged by profitability, managers continued to focus on the relatively large portion of the company revenue (about 1%) spent by IS.

- The explosive growth of microcomputers in corporations has presented executives with a two-fold problem:

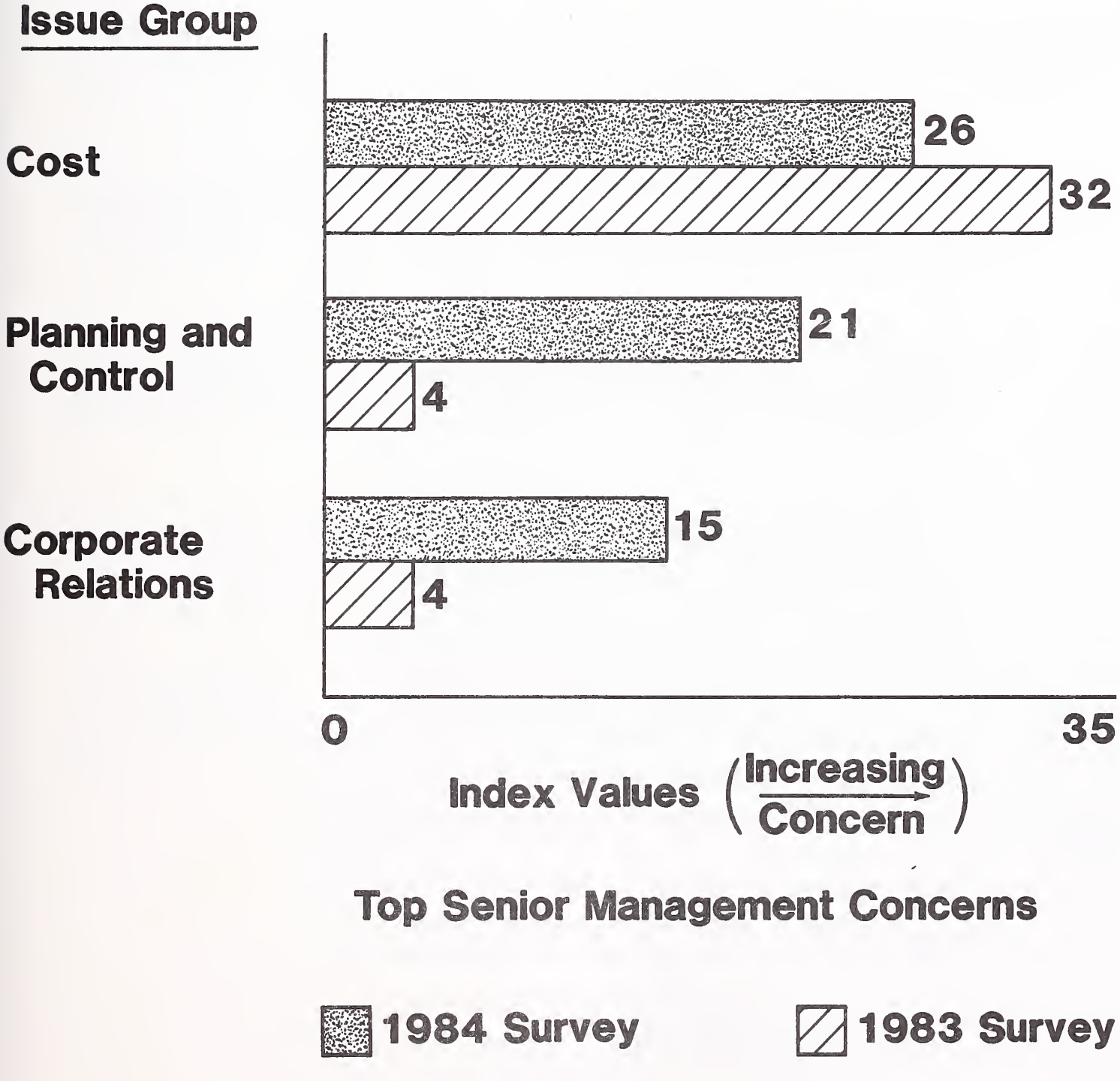
  - Computing expenses are no longer centralized in one department.

  - The growing use of individual computers raises the risk of data integrity and security problems.

- The executives' growing awareness of the problems of end-user computing can be a benefit to IS. IS must address these concerns by establishing strategies to facilitate the proper use of corporate information while working with management to assure that computing expenses are being properly utilized. This is not an easy task. Unfortunately, though, IS is not focusing its objectives on these issues.

EXHIBIT II-4

SENIOR MANAGEMENT CONCERNS ARE SHIFTING AWAY FROM COST

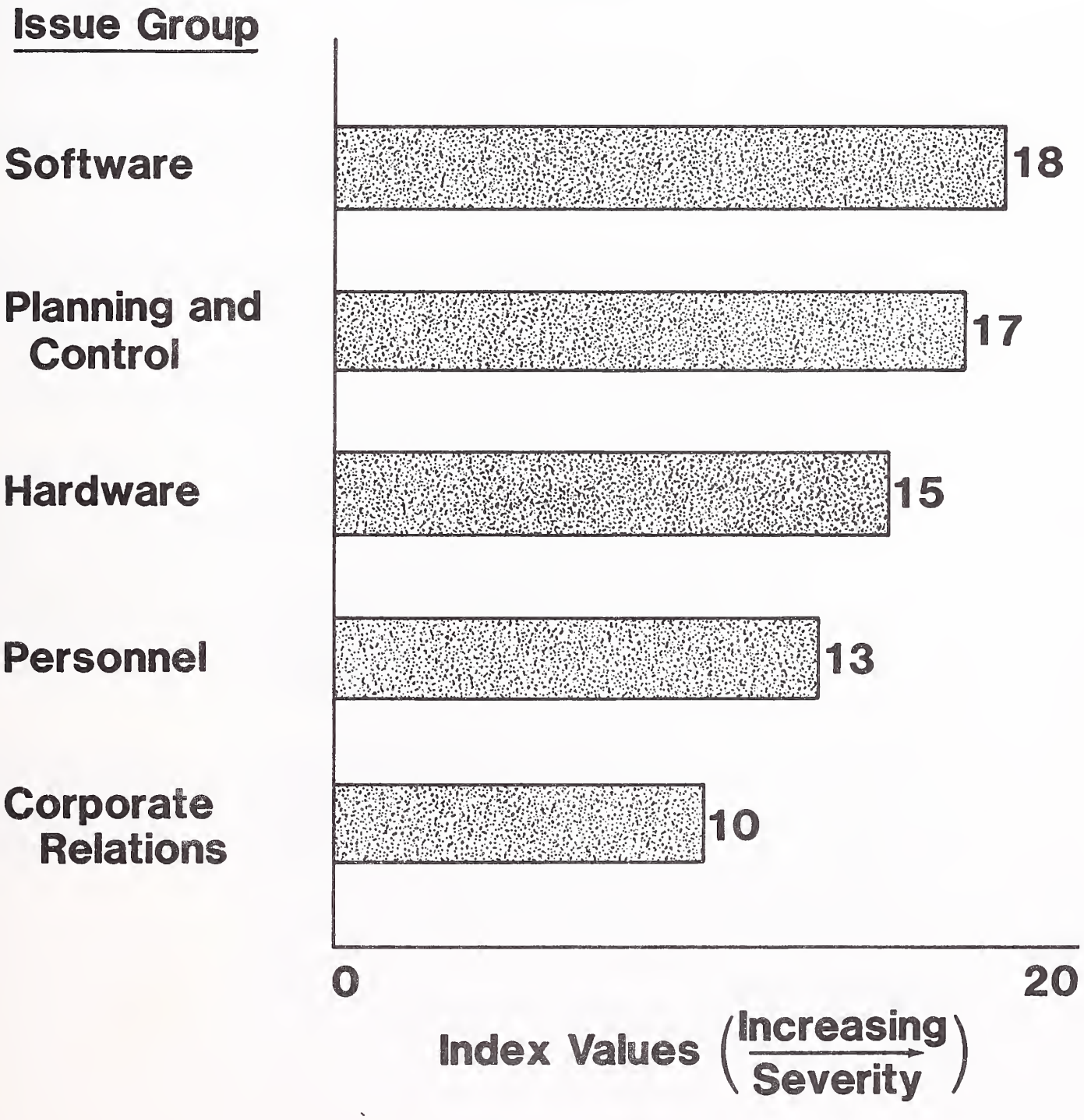


E. THERE IS NO DOMINANT I.S. PROBLEM

- There is no single group of issues that dominates IS problems. Important individual issues include:
  - Application development.
  - Programming backlog.
  - Hardware upgrades.
  - Qualified personnel.
  - User relations.
- The current IS problem of distribution is similar to that during previous years. End-user computing, though not one of the top problem areas, has increased in importance since last year. Telecommunications have decreased in importance.
- Although software problems do not dominate other issues, their importance has grown from last year's survey. The IS managers perceive fewer problems with corporate relations and planning and control issues than were reported last year.
- It still appears that IS managers are reacting to problems. Problems cover most issue groups, and issues are designated as problems by users and senior management. IS must become more proactive and successful.

EXHIBIT II-5

THERE IS NO DOMINANT I.S. PROBLEM



Top IS Problems

F. SOFTWARE DOMINATES I.S. OBJECTIVES

- Software is becoming an increasingly dominant objective for IS managers. It is considered more than twice as important as planning and control, the second most important objective.

  - Most of the software objectives center on application development.

  - Software upgrades to operating systems and software packages are the second highest priority for the software objective.

- Planning and control objectives have overtaken hardware as the second most important objective.

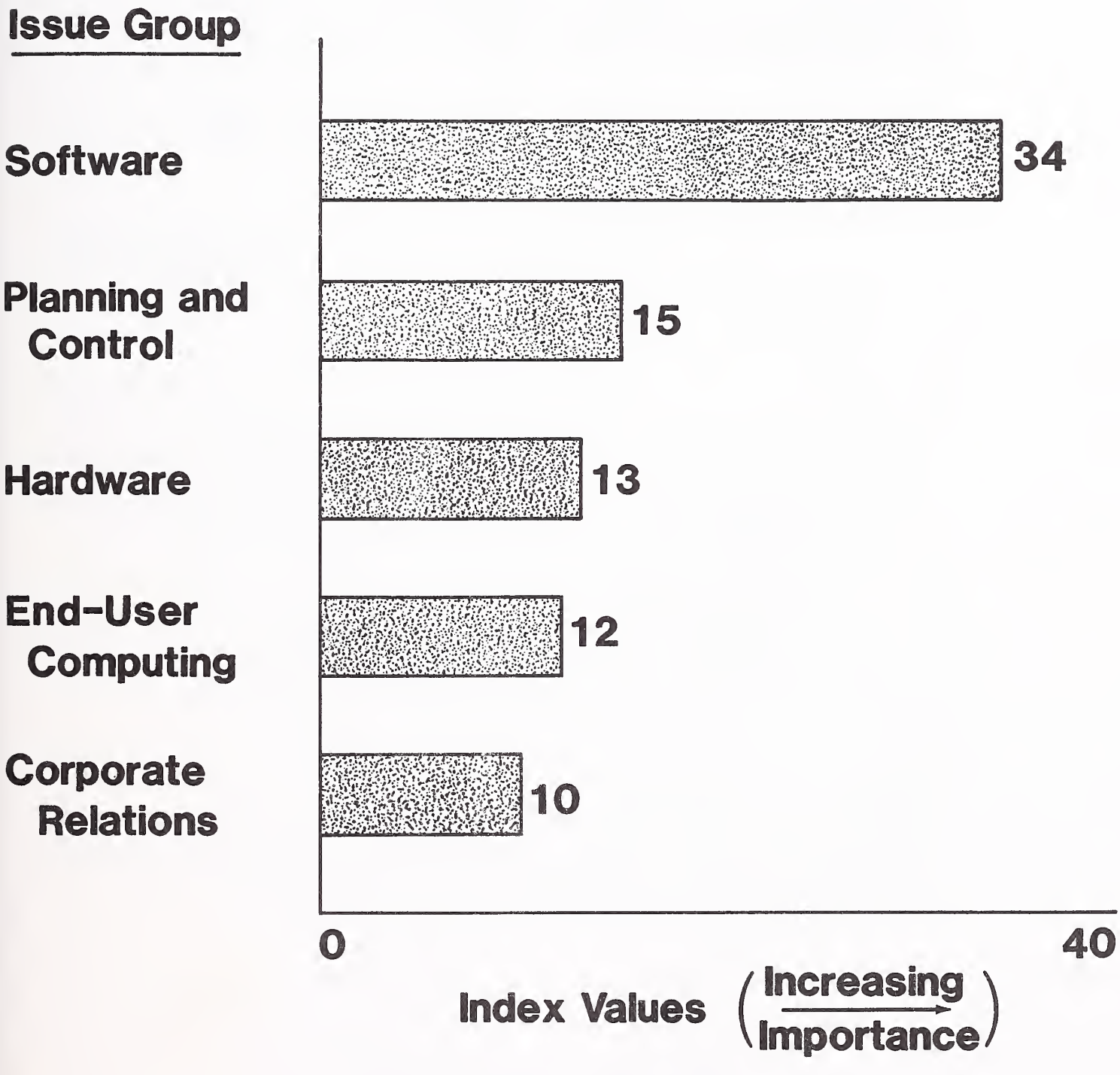
  - General planning, management, and control objectives are emphasized in this issue group.

  - The backlog of programming attracted lower priority than in previous years. Its place has been taken by security and data integrity objectives. This change in priority is possibly the result of the solution to backlog (that is, information centers and microcomputers); this solution causes problems in security and data integrity.

- Personnel, which is the fourth most important IS problem, received one of the lowest priorities as an IS objective. IS managers still believe there is little that can be done to solve these problems. This belief can be very destructive to the company and to IS in particular.

EXHIBIT II-6

SOFTWARE DOMINATES I.S. OBJECTIVES



Top IS Issues

G. END-USER COMPUTING IS THE MOST SIGNIFICANT CHANGE TO AFFECT I.S. DEPARTMENTS IN THE NEXT THREE YEARS

- End-users computing issues are of primary concern to IS managers' planning. They believe it will have the greatest impact on their organization over the next three years.

- Although end-user computing is the dominant long-range concern, IS managers rated it as being of low importance as an IS problem.

  - This is possibly due to the reactive mode under which IS operates. If no one is currently demanding attention for an issue, IS usually does not perceive it as a problem.

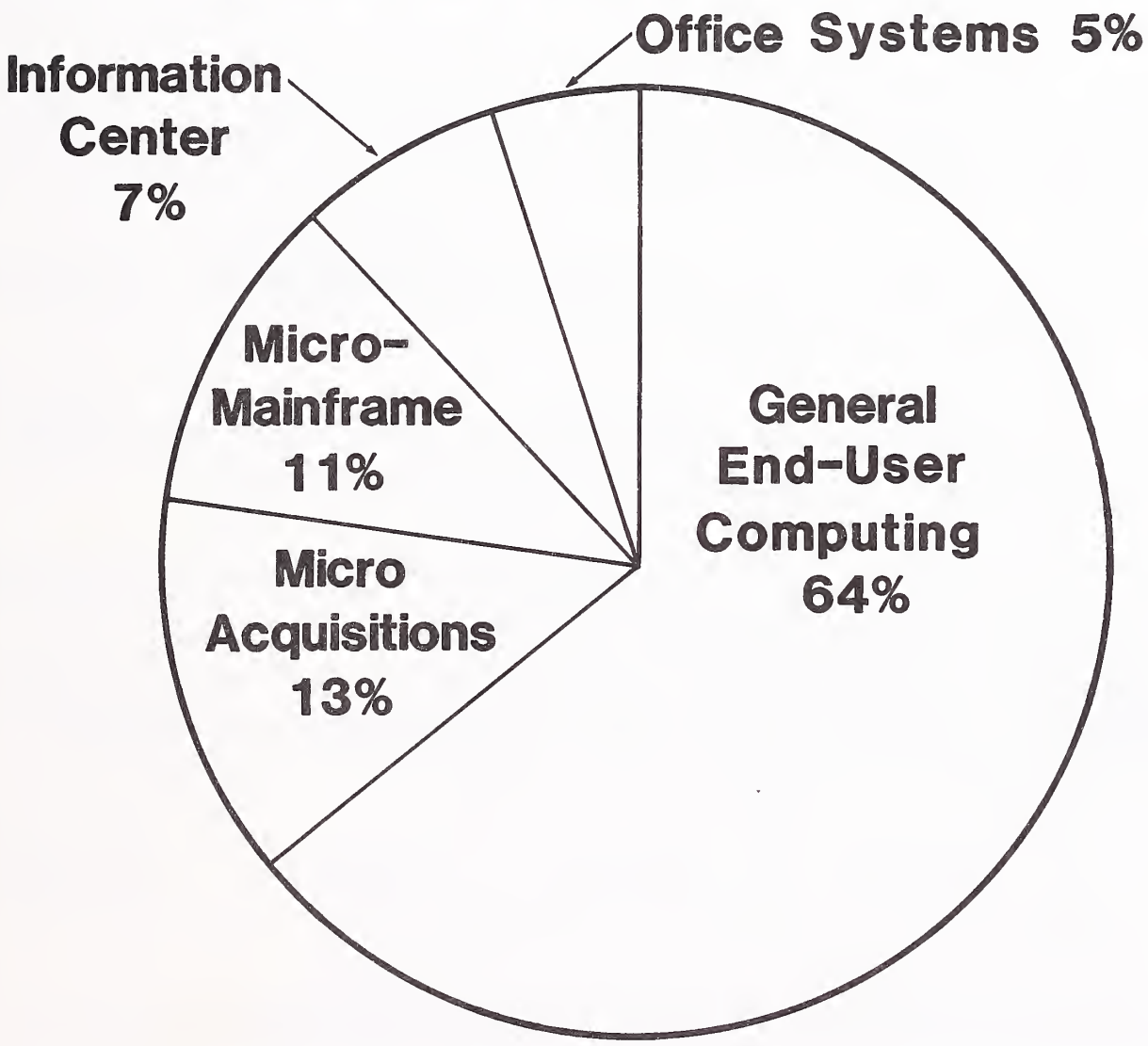
  - IS, like the rest of the organization, is aware of the media hype directed at the end user (i.e., relating to the personal computer). This awareness translates into knowledge that end-user computing will affect IS soon.

  - IS is unclear about which aspects will cause them the most concern. The respondents thought that every aspect of end-user computing--not just microcomputers--will impact IS.

- The second most prominent area to affect IS will be software. Here IS had a clearer picture of which areas would have the greatest impact: applications development and software upgrades. Software is considered only about half as significant as end-user computing in relation to its impact on IS.

EXHIBIT II-7

END-USER COMPUTING IS THE MOST SIGNIFICANT CHANGE TO AFFECT I.S. DEPARTMENTS IN THE NEXT THREE YEARS



End-User Issues

H. TOP I.S. OBJECTIVES DO NOT ADEQUATELY MATCH PROBLEMS AND AREAS OF CHANGE

- IS managers' objectives emphasize software issues. These issues are more than twice as crucial as the second highest priority, planning and control.

- The problems perceived by IS are mostly of medium importance, and IS objectives could satisfy them. But these problems all appear to be short-term and reactive in nature.

- The longer term concerns, those of senior management, and those that will affect IS in the next three years, will not be satisfied by objectives ranked by the over 250 IS manager respondents.

  - Only planning and control and end-user computing objectives address the more strategic concerns.

  - The relatively low priority of objectives other than software makes it difficult for these issues to be properly addressed by IS.

- IS must become proactive. It must incorporate longer term objectives in its plan and must give them sufficient priority so they can be adequately addressed. Operational problems will always exist and must be solved, but long-term issues and the concerns of senior management must not be ignored.

EXHIBIT II-8

TOP I.S. OBJECTIVES DO NOT ADEQUATELY MATCH PROBLEMS AND AREAS OF CHANGE

Issue Group	Objectives	IS Problems	Senior Management Concerns	Changes Affecting IS
Software	Very High	Medium	Low	Medium
Planning and Control	Medium	Medium	High	Low
Hardware	Medium	Medium	Low	Medium
End-User Computing	Medium	Low	Low	Very High
Corporate Relations	Medium	Medium	Medium	Low

Priority of Objectives Versus Problems, Concerns,and Changes

III IBM'S GENERAL SYSTEM DIRECTIONS

III IBM'S GENERAL SYSTEM DIRECTIONS

- SNA is IBM's gradually evolving plan for distributed processing. It has essentially been an exercise in control of network development in order to assure maximum hardware placement. SNA has been large host oriented with monolithic operating systems that have driven the demand for even larger mainframes. Despite substantial evidence of more cost-effective solutions, the IBM strategy has been quite successful. A brief review of distributed data processing (DDP) and the IBM strategy for control will provide the necessary foundation for discussing IBM system directions.

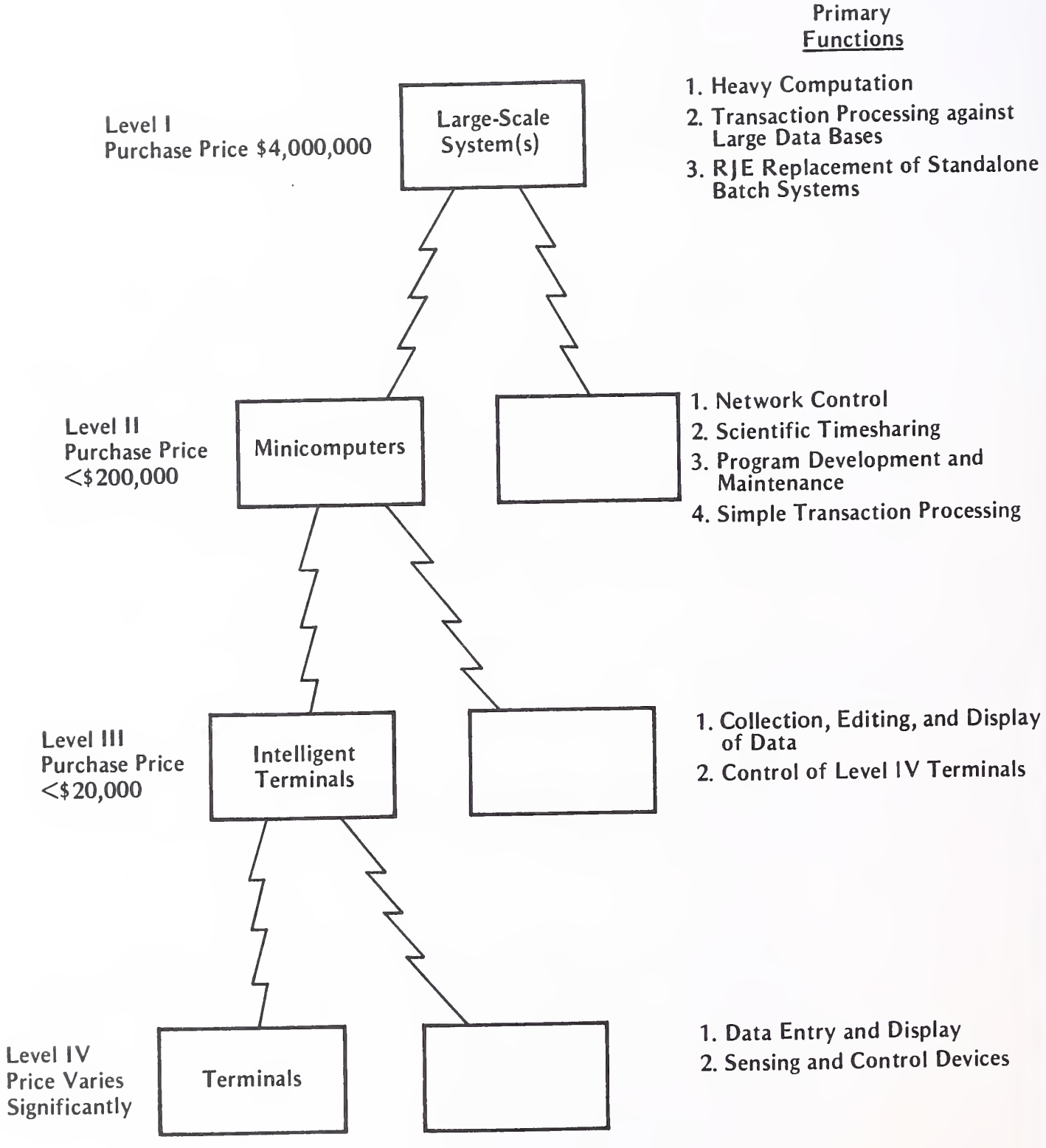
A. DDP VERSUS IBM

- For over eight years, INPUT has propounded both the geographic and architectural distributions of processing as being inevitable because of cost effectiveness.

  - The geographic distribution of processing was first presented in the Economics of Computer/Communications Networks and Their Future Impact (1976). The schematic of a "proper" hierarchical network has been published in numerous INPUT reports, with only minor modifications since that time. The original (1976) version, depicted in Exhibit III-1, shows primary functions at various levels, which are still valid.

EXHIBIT III-1

HIERARCHICAL NETWORK



- There is little cost justification for standalone systems between large-scale systems and minicomputers.

- Regardless of terminology, the price levels have remained fairly consistent among the various levels and their proper functions.

- It would not be entirely unfair to say that IBM's past SNA-oriented hardware/software strategy has been to assure that the proper distribution of functions within this network did not occur. The SNA distribution of processing based on the venerable 3705/3725 and 3790/8100 (and their associated software) has been highly effective, considering that hardware integration and centralization of operating systems functions remained paramount in IBM's direction. The expense of specialization function would have been dictated by the proper distribution of function, as depicted in Exhibit III-2.

- The architectural distribution of processing was first presented in an INPUT Report titled, The Future of Large-Scale IBM Mainframes (1978-1983), May 1978. It concentrates on the distribution of operating systems functions to backend data base machines and frontend communications processors. Exhibit III-2 highlights the following points from the report:

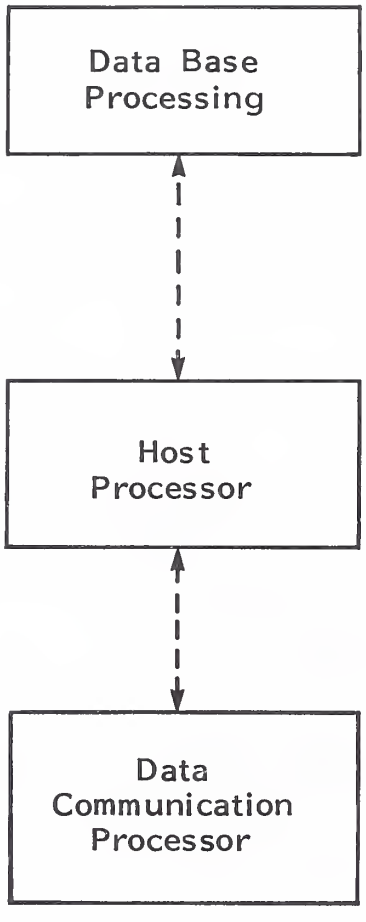
  - Research disclosed that commercial users estimated that 70%-90% of their total processing workload could be accomplished with the capacities of a proposed data base processor.

  - An estimated 20%-30% of host processing could be off-loaded if terminal servicing and network management functions could be off-loaded onto a data communication processor.

  - This raised the "unthinkable" question of why large-scale mainframes even exist, if in fact these estimates bear any relationship to reality.

EXHIBIT III-2

ARCHITECTURAL DISTRIBUTION OF PROCESSING
(1978)



POTENTIAL HOST OFF-LOADING

(70-90%)

(20-30%)

- It is obvious that in the last six years, IBM has been highly successful in preventing any serious erosion of operating systems functions in the SNA environment, although a flurry of Series I activity ran counter to SNA. The installation of standalone personal computers in the corporate environment effectively shattered the highly integrated and centralized systems represented by SNA. Nothing could have been more dramatic than that reaction to the unnatural restrictions imposed on the normal evolution of computer/communication networks!

- IBM's current emphasis on intelligent workstations (PC-based) appears to be merely a continuation of the resistance to the proper distribution of processing and data in a hierarchical network.

  - Already, certain "words of wisdom" are beginning to surface among the IBM pundits:

    . "Minicomputers are dead!"

    . "Intelligent workstations will make enormous demands on the host."

  - These statements may be essentially true if IBM's strategy succeeds. Certainly the 4361 and XT 370 represent a direct assault on the minicomputer hardware, and the software strategy certainly appears to be designed to obscure the proper distribution of almost anything by offering so many alternatives as to defy classification.

  - There is one major caveat to this rather harsh judgment: the explosion in microprocessor-based workstations and/or systems threatens a dramatic increase in overall systems instability, and a good argument can be made for maintaining central control.

B. IBM'S OPERATING SYSTEM DIRECTIONS

- IBM's response to the proliferation of standalone personal computers in the corporate environment has been based on two perceived threats: 1) true off-loading of processing from mainframes, and 2) the potential of personal computers to be used as inexpensive, intelligent terminals. Over a year ago, Don Estridge of IBM stated: "The PC is communications oriented. The day of the standalone is over." The primary impetus for micro-mainframe links from IBM's point of view is integration. Intelligent workstations are going to become more dependent upon other parts of the systems--specifically on mainframes, hardware, software, and data.

- IBM is cognizant of the necessity for centralized storage management. The preferred manner in which central control will be exercised over distributed storage is an issue of primary concern. It can be predicted with some degree of certainty that the primary objective will be the centralization of massive, physical storage facilities. (In other words, the strategy will be to increase the demand for both main memory and direct-access storage.)

- Because of IBM's emphasis upon the centralized corporate data base, the direction in protection and security will also be toward highly centralized control; this will probably be a major IBM asset in the marketplace.

  - In fact, it is probable that protection and security will be extremely important in IBM's overall storage, and it will be used to:

    . Exercise account control by refusing "certification" for competitive hardware, software, and services.

    . Promote the sale of hardware, software, and services through certification of IBM protection and security features and facilities.

- The IBM image is going to be hard to beat in this area, but there is one saving grace: the true cost of an IBM-secured system is going to be high.

- Over a year ago, IBM announced that there were more installed MIPS in PCs than there were in mainframes, and this trend has obviously accelerated since then. IBM's direction in resource allocation will be to assure that those MIPS are not employed to diminish the ever-increasing demand for mainframe MIPS. Since a high percentage of mainframe MIPS are used to execute IBM operating systems software, maintaining central control of resource allocation is not only necessary, but self-fulfilling. This will result in the following:

  - As intelligent workstations are added, requirements for mainframe power will increase sharply.

  - For every dollar spent on workstations, substantially more will be spent (over the application life cycle) on host services (processing and storage).

  - Host processing will extend to the workstation only when host processing receives its "fair share" of the host operating systems burden. (The XT 370 is a good example of how to burn microprocessor MIPS without substantially off-loading mainframes; this will be explored in more detail later.)

  - IBM's primary direction will let individual operating systems proliferate at all levels (host down through PC) and then maintain central software control through VM (or some comparable facility).

  - Although selected software is a leading edge, the overall trend will be toward prepackaged operating systems.

- It is INPUT's opinion that SNA is in itself a superstructure for exercising "flexible" central control of all network layers, and that VM will play a role of great importance in permitting various "minor systems" to orbit around the host.

- IBM has a vested interest in complexity, which can best be achieved by centralization through continued growth of the leading part (large host-operating systems).

- IBM's direction toward growth of the central control function will force the growth of the large central host rather than specialized boxes. This does not preclude the isolation of specific operating systems functions and the transfer into firmware and/or hardware. It does mean that these functions and their implementations will be tightly coupled with the host system. However, IBM's hardware/firmware/software (H/F/S) strategy will be tempered by a distasteful past experience, which was at least as bad as the original OS/360 problems.

  - IBM's abortive Future Systems (FS) represented the type of layered H/F/S approach that INPUT anticipated would occur in distributed processing networks. But this approach failed.

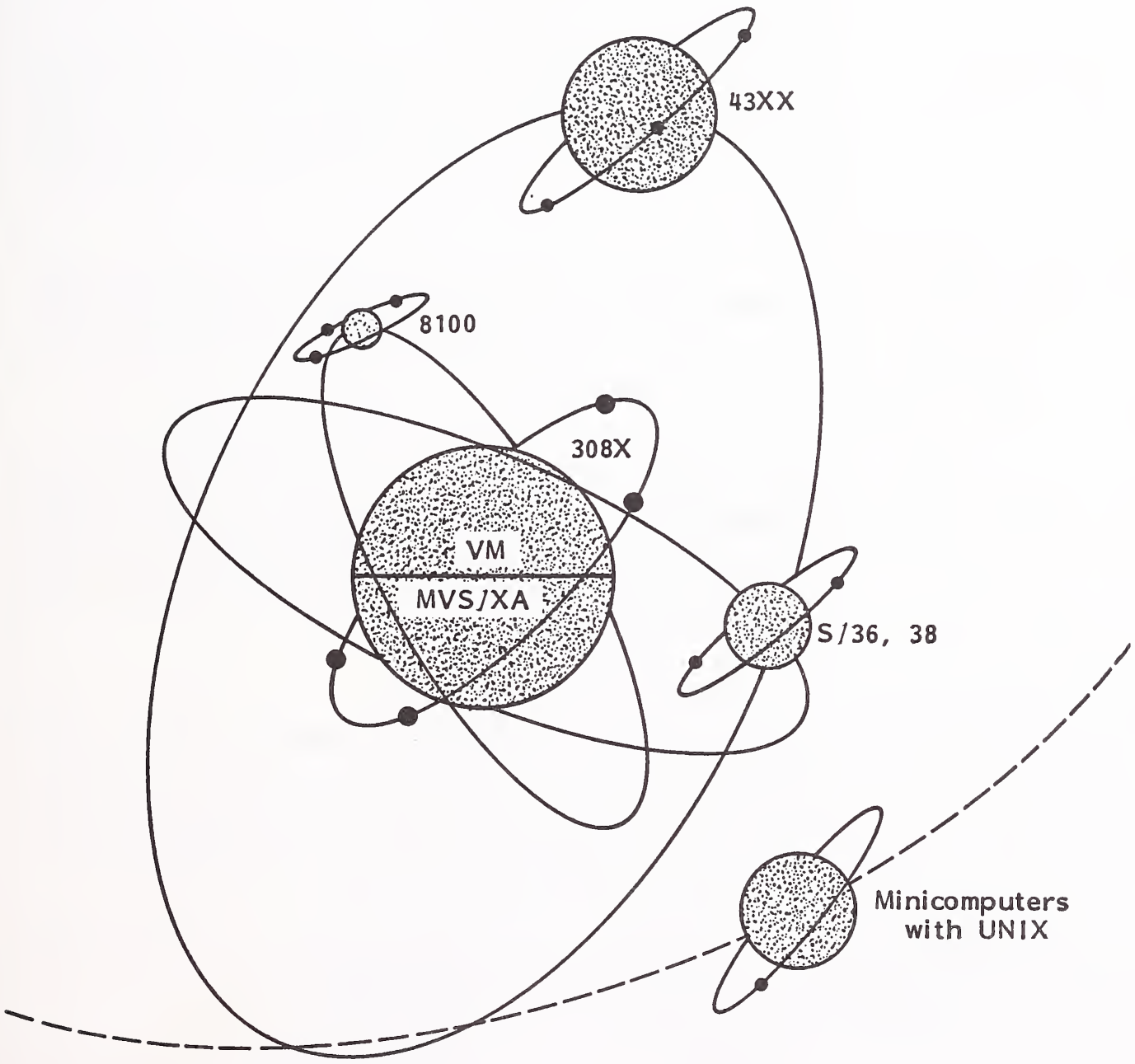
  - The problem was the scope of the effort and the discovery that maintenance of such grand systems could not be readily "engineered" because of interdependencies at the various levels.

C. IBM'S HEAVENLY STRATEGY

- IBM's current SNA/operating systems strategy cannot easily be pictured using traditional means. Instead, it is necessary to "turn to the heavens." Indeed, IBM's software directions at all levels can best be pictured by visualizing the attraction of mass, shown by Exhibit III-3.

EXHIBIT III-3

IBM's MICRO-MAINFRAME SOFTWARE DIRECTIONS



- The mass of the central control functions (VM and/or MVS/XA) represents the IBM progressive control direction, which has just been described. This direction is the primary source of attraction for all of IBM's planned SNA satellites, from intelligent terminals through 8100s and 43XXs. However, a number of other aspects of the attractions of mass are worth noting.

  . The total mass of PC-based intelligent workstations is bound to attract a lot of cosmic dust (independent software of all types) into the control of the IBM series. (It was obviously planned this way.)

  . Unplanned satellites and operating systems such as the IBM System 36 and System 38 must be roughly accommodated as the central mass grows.

  . Some satellites are planned to grow into series themselves (such as 43XX growing into 4381) as they receive a massive transfer of energy from the central source (MVS/XA), which causes them to explode suddenly into 308Xs. (This is very much part of the plan and is as old as IBM.)

  . Some minicomputers (especially Series/1) will be loosely accommodated, but they will not be permitted to drain very much energy from the central source. (Their orbits will be fixed firmly in process control and other places where they belong.)

- Then there is a whole raft of spectacular phenomena that keep bursting onto the scene. They are treated as follows:

  . Flashy little meteorites--such as high performance data base systems and full-function communication frontends--are expected to fall harmlessly on the major satellites.

- At infrequent intervals a comet passes briefly into view, and it is given passing recognition. However, it is hoped that the comet will just wander off forever and disappear.

- Then, of course, there are heavy meteorites that have a rather severe impact on the existing planets; but it is hoped that they won't be too frequent and that eventually the craters will disappear so no one will know what caused them. (IBM is hopeful that the use of minicomputers for interactive computing will fall into this category.)

- IBM's general software direction indicates enormous expenditure of energy (human, processing power, and information) in supporting large, centralized hardware/software systems to control the rapidly expanding SNA universe. These large central systems are not known for their efficient use of processing power.

- The specific IBM strategies of the operating system sector of the universe demonstrate IBM's approach to energy conservation.

1. MVS/XA

- IBM has clearly indicated that MVS/XA is in its mainstream operating system and has emphasized that XA is really a new architecture and not just another operating system release. Perhaps this is so, but let's be realistic: XA actually looks pretty tired when we consider the following:

  - Going from 24-bit addressing to 31-bit addressing is no big deal for IBM users who have been exposed to the FS-spawned System/38, which has 48-bit addressing.

- Although XA will permit storage of virtually two gigabytes and up to 256 channels, even IBM believes XA will run out of capacity in the late 1980s". (The IBM Director of Product Strategies from the Data System Division stated so at the IBM-conducted Computer Services Conference in 1983.)

- As another IBM spokesperson stated during research for this study: "XA really stands for 'extended accommodation.'" Its primary purpose is to accommodate the IBM software system itself, which is growing faster than the hardware to run it. It is paradoxical that IBM now presents "performance ranges" based on the MIPS consumed by XA's various operating systems without any direct reference to what these systems provide the user in terms of performance. It is even more ominous when the customer accepts such "measures of performance."

- There is no question that IBM wants its customers to migrate to MVS/XA (despite recent enhancements to DOS/USE). The migration will become necessary and will require further extension as more and more intelligent workstations (and their controllers and remote processors) start orbiting around the hosts. In fact, it will not require too many intelligent workstations to force MVS/XA (or other top-line operating systems) right into the office environment. All it will take is a start toward electronic filing of paper documents. (There will be more discussion on this topic later.)

- Through all of this, major IBM customers may grumble, but eventually they will follow.

2. VM/CP

- IBM is currently on record as supporting VM in parallel with MVS/XA to the extent that the resources being applied to each are equivalent. However, IBM has specifically denounced the implication that MVS/XA has lost favor,

stating that both have their place and that there is no plan to provide VM with all of the functionality of MVS. This is probably true. However, it is equally true that VM has become the primary leading part for effecting the progressive centralization, which is the predominant direction of IBM's operating systems strategy. Consider the following:

- It is a well-publicized fact that VM/CMS will be enhanced (with extended addressing) in all its versions, from large hosts down to intelligent workstations. (The XT 370 announcement in itself is significant for its support under VM/CMS.)

- VM/CMS has obviously been selected as the "fighting system" against UNIX.

- However, more important is the fact that conceptually VM/CP is designed to sit on top of other operating systems--any operating systems--and pretend they are running on their own machines. The obvious potential advantages of this in dealing with both real and virtual machines in the processing hierarchy are apparent.

- The center of the IBM software universe has two hemispheres, and they are of equal importance. MVS/XA (and all its inevitable releases, extensions, etc.) is important for the direct control of the SNA-prescribed satellites, and VM is important for controlling the wandering comets and the phenomena that haven't quite settled firmly into orbit.

- VM/CP is a natural; since over the years it has remained out of the mainstream, it has remained relatively clean. But there is one negative aspect: it does add a burden to the already laboring central processors. During a discussion about the VM scenario with an ex-IBM employee, it was agreed that VM was a logical vehicle in the environment that has been described. "But," he said, "they will probably find some way to screw it up."

3. UNIX ANYONE?

- The Computer Science and Engineering Research Study (COSERS), sponsored by the National Science Foundation, completed the 1978 study (revised 1979) entitled What Can Be Automated? and was produced using UNIX. The study defined the following three objectives for operating systems:

  - Maximum ease of use.

  - Maximum use of equipment considering efficiency and cost reductions.

  - Effective development, testing, and introduction of new systems functions without interfering with service.

- At IBM Research in Yorktown Heights, an academic environment prevails. And where an academic environment prevails, there are those who are familiar with UNIX. The most succinct advantage put forth for UNIX by these IBM employees is: "It is containable in the human brain." This is a nontrivial advantage.

  - It means UNIX is understandable and its functions can all be comprehended. That is, it is easy to use. Thus, it satisfies one of the broad objectives of operating systems.

  - In addition, UNIX is generally a clean system and certainly makes more efficient use of hardware than VM/MVS. Therefore, the second objective is met.

  - The lack of complexity (and function), which leads to both of the above advantages, should also permit more "effective development, testing, and introduction of new systems functions" and satisfy the third general objective.

- It seems apparent that, at least by the standards of the COSERS committee, UNIX is a pretty hot item. However, the committee participating in the study was academically oriented, and there is no question that UNIX was born and bred in an academic environment.

- The question of whether or not UNIX can be ported to large mainframes with sufficient function to satisfy complex commercial environments without losing its current advantages has already been raised. Although it is no trick to improve on the performance of IBM systems (from the perspective of both hardware and ease of use), it is probable that there will be some surprises when and if UNIX is extended beyond minicomputers (and even down to microprocessors).

- Regardless of how well the transition is accomplished, IBM's probable tactics are clear.

  - UNIX will be labeled an academic, minicomputer-based operating system modeled on a system that goes back in history further than MVS.

  - Functional comparisons will be made against all available IBM systems, regardless of significance in the particular situations, and UNIX will always be found wanting.

  - VM/CMS will be enhanced as a specific competitor in particular market segments.

  - Failing all else, IBM will provide UNIX "if that's what (users) really want."

- VM/MVS (and the rest of the IBM software universe) exceeds the human brain mass of even the most seasoned systems programmer. Pity the poor UNIX marketing representatives who engage in technical discussions about the

relative merits of their product with IBM-indoctrinated IS departments. The terminology alone will be an enormous barrier. It is probable, then, that the UNIX comet will pass from view without serious disruption to the IBM solar system.

D. MICRO-MAINFRAME CONNECTIONS

- IBM is prepared to support multiple-PC operating systems and an infinite variety of connections to the mainframe--through controllers, small business systems, mid-range mainframes, or practically anything except minicomputers, which have a bad connotation for IBM.

- The announcements of the 3270 PC and XT 370 were precursors to IBM's distributed processing strategy.

  - These systems make intelligent workstations look like 3270s but permit them to tap into multiple data sources at various levels within the processing hierarchy (remote mainframe, local controller or processor, and/or personal data bases). The fascination with "windowing" sometimes ignores the fact that it is only symptomatic of a more fundamental restructuring of data bases.

  - The XT 370 announces to the world that if you are going to have the processing power of an IBM mainframe (of recent vintage) on your desk, it should look like an IBM mainframe and be supported by real software such as CMS.

  - Both the 3270 PC and the XT 370 have two other significant ramifications.

- You can turn them into pumpkins and use them on a standalone basis any time you want. But their real justification and "proper use" must be under the great SNA umbrella.

- Both are designed to put enormous pressure on minicomputers and their functions.

- The strategic importance of IBM's signaled direction in micro-mainframe links is to redefine the distributed processing hierarchy and eliminate high-performance minicomputer systems operating under reasonably efficient operating systems such as UNIX.

  - Large mainframes will provide centralized control of the network and distributed data bases.

  - Intelligent workstations can be used for program development and maintenance, and simple transaction processing against personal data bases. (Forget the current XT 370 and VM/CMS limitations; IBM always proceeds carefully in these matters.)

  - Scientific timesharing can be split between the workstation and the host.

  - Thus, the VM/CP and MVS/XA threads run from the large host mainframe through remote processors (including controllers) to intelligent workstations without benefit of significant distribution of processing power (or centralized control) from the host system.

- Early experience with XT/370s has led to some important conclusions:

  - The 12-bit addressing limit and 20MBs of disk storage places a severe limit on the use of the XT/370 for program development and maintenance.

- Even compilers tax the storage limit (which also indicates how much the host software has grown). Perhaps some attention should be given to compiler writing again.

- Although the XT/370 may be slow for most things, it does provide "more or less instantaneous response for editing on the screen." Wow! There we are right back to the proper function of an intelligent terminal as defined by INPUT over eight years ago.

IV MAJOR CROSS-INDUSTRY ISSUES

IV MAJOR CROSS-INDUSTRY ISSUES

A. INTRODUCTION

- The Annual Survey summarizes and analyzes the responses of 256 IS organizations. Where appropriate, information is segmented by company size or industry sector. This section is divided into the following subsections:
  - IS budgets.
  - IS planning issues.
  - IS applications developments.

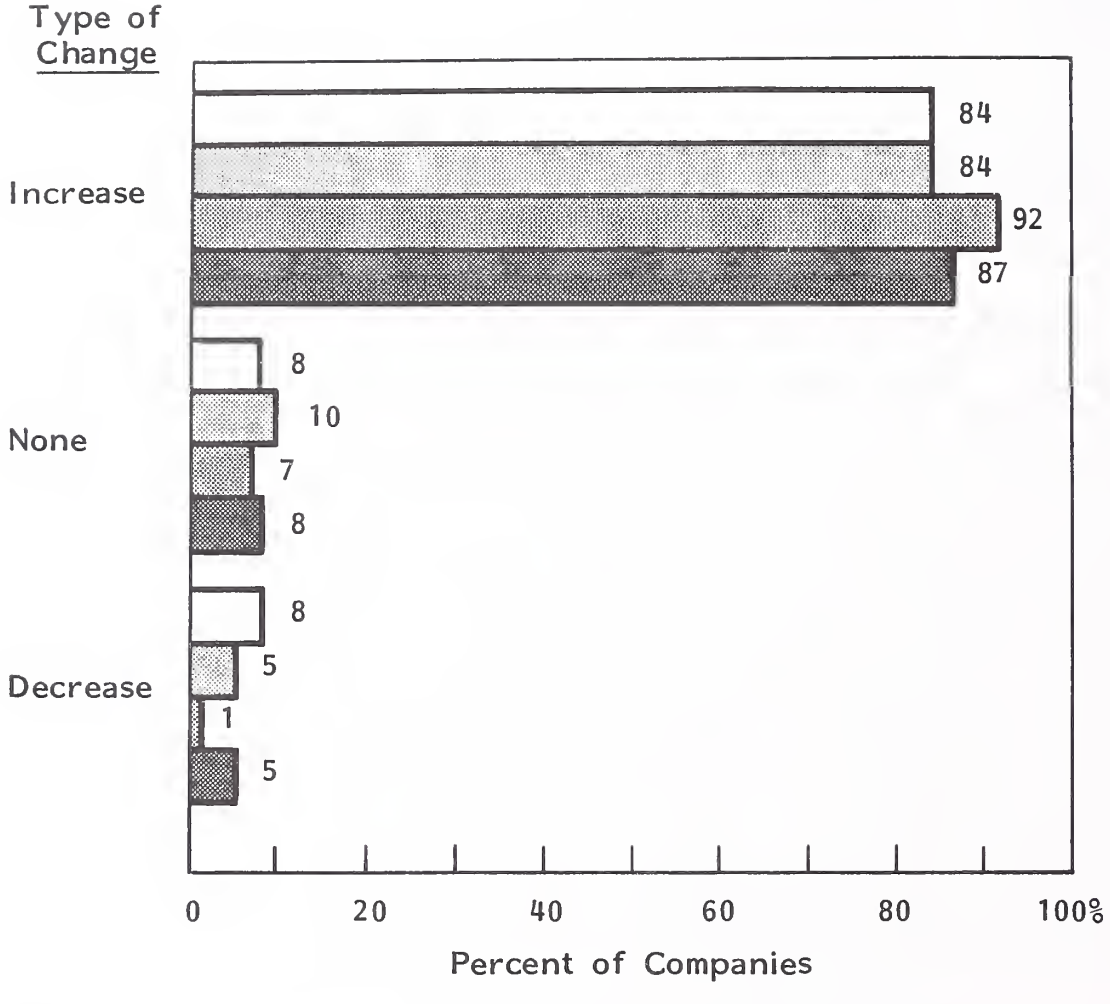
B. ANNUAL SURVEY FINDINGS

1. INFORMATION SYSTEMS BUDGETS

- Most of the firms surveyed expected to see an increase in their IS budget in 1985, as shown in Exhibit IV-1.

EXHIBIT IV-1

ANTICIPATED BUDGET CHANGES FOR 1985
BY COMPANY SIZE



Key:

- Under $250 Million
- $250 Million to $1 Billion
- Over $1 Billion
- Total

Source: INPUT Surveys

- For most of the firms, the alternatives to an increase is no change, i.e., keeping the same budget as in 1984.

- The size of the firm had no major bearing on whether budgets increased.

- The average rates of budget change vary considerably by sector. The overall expected average is 11%, as shown in Exhibit IV-2. Values range from a low of 4% for medical to 14% for utilities. This reflects events occurring in each sector.

  - The medical sector suffers from volatile funding from hospital administration committees. The impact of user-funded computing is also prevalent in this sector.

  - Utilities are still "catching up" from past budget stagnation in 1979-1982.

- In 1985 many sectors are planning budget increases.

  - The medical and distribution sectors grow only half as fast as during 1983. Distribution's growth decline is due primarily to the assimilation of the point-of-sale technologies that have fueled previous years' high growth rates and the transfer of budgetary responsibility for some computing functions to user departments.

  - Discrete and process manufacturing sectors are planning the largest increase in growth rates. These sectors are recovering from sluggish growth during previous years, caused by the recession.

- Not all budget categories will be growing at the same rate. Spending on custom programming services and "dumb" terminals is expected to decline, while the spending rate increases significantly for mini and micro computers as well as for mass storage devices, as shown in Exhibit IV-3.

EXHIBIT IV-2

INDUSTRY I.S. BUDGET GROWTH

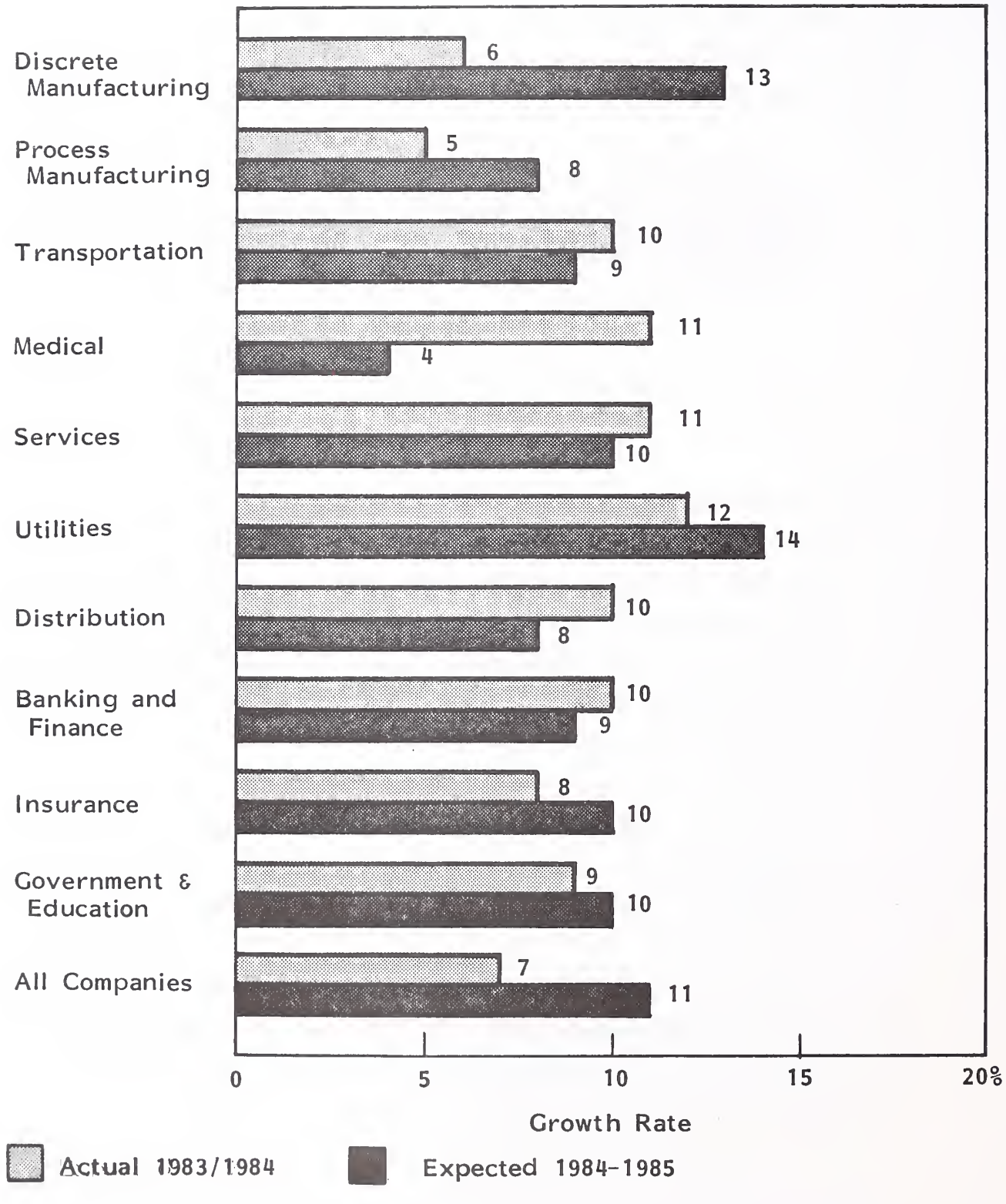


EXHIBIT IV-3

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	41.4%	7.4%
Mainframe Processors	11.3	3.4
Minicomputers	2.5	16.5
Microcomputers	1.9	18.3
Mass Storage Devices	5.5	13.0
Terminals	3.8	(2.1)
Peripherals	3.5	4.0
Total Hardware	28.5%	8.6%
Communications	9.3	9.4
External Software	4.5	8.3
Custom Programming	3.1	(12.2)
Integrated Systems	0.8	0.7
Total Software	8.4%	0.0%
Software Maintenance	1.1	11.6
Hardware Maintenance	5.7	8.7
Total Maintenance	6.8%	9.2%
Outside Processing Services	1.4	6.6
Other	4.2	4.9
Total	100.0%	10.8%

- Micro- and minicomputer spending will, in fact, be growing at a even higher rate since so much of it is taking place outside of the IS department. The growth in mass storage devices is due in large part to end-user computing. The advent of micro-mainframe links should make this budget category grow even faster throughout the rest of this decade.

- The decline in terminal spending is also related to end-user computing and micro-mainframe links. Many companies are experimenting with replacing conventional terminals with microcomputers connected to host processors. This phenomenon is described in the following INPUT reports:

  . End-User Micro-Mainframe Needs, July 1984.

  . Micro-Mainframe: Communications Issues, July 1984.

  . Executive Workstation Acceptance: Problems and Outlook, April 1984.

- Firms spend an average of about $1,100 on IS for every corporate employee, and $82,300 for every IS employee, as shown in Exhibits IV-4 and IV-5. There are wide variations by industry sector, however.

  - Services, distribution, medical, and government and education spend appreciably less, reflecting the relatively low levels of automation in these sectors.

  - Insurance and banking/finance spend much more than average per corporate employee, reflecting these sectors' long-standing automation and, in the case of insurance, the distribution network's separation from the corporate entity in most cases. Interestingly, these sectors spend less than the average amount per IS employee, which is reflective of the larger sizes of these companies' IS staffs.

EXHIBIT IV-4

1984 BUDGET PER EMPLOYEE

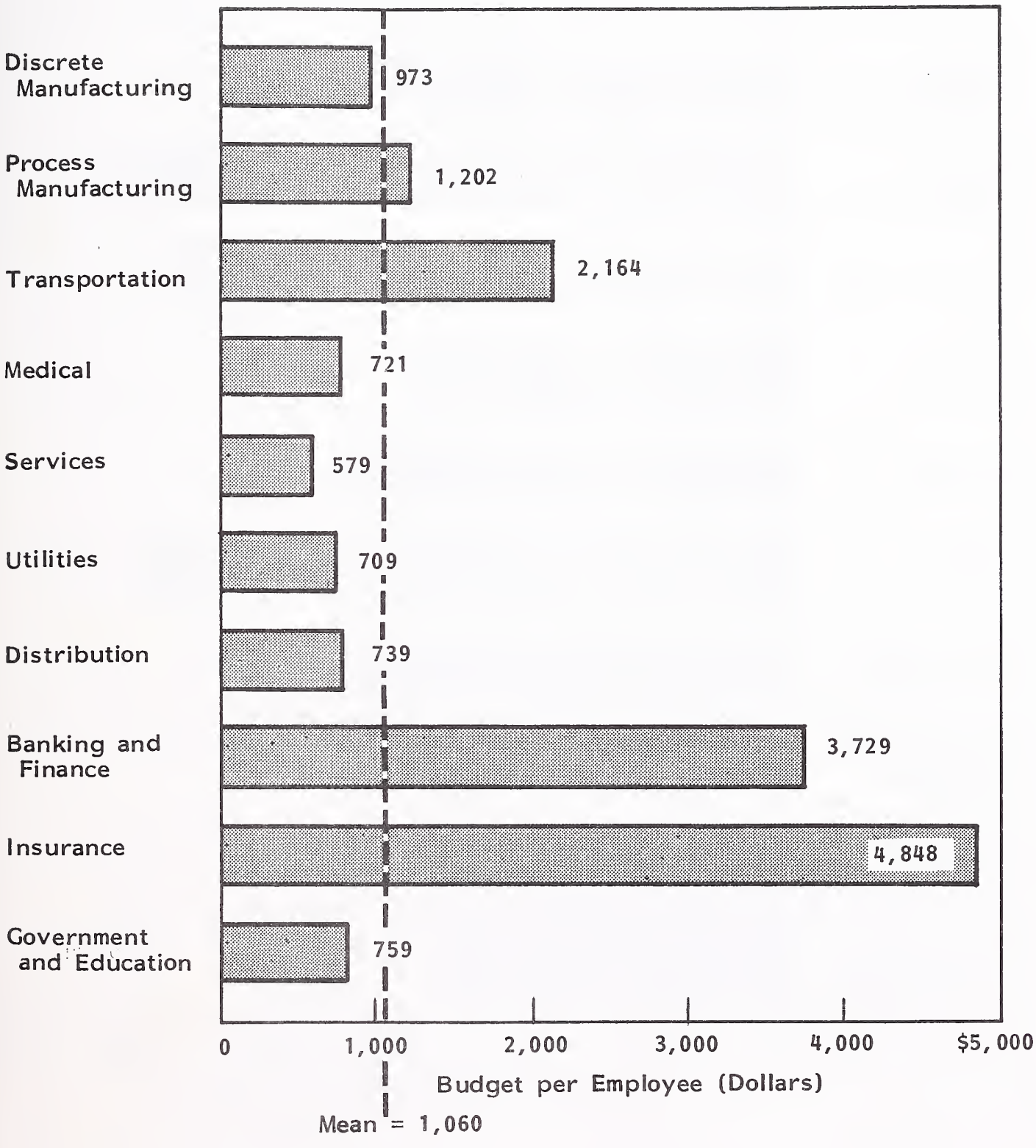
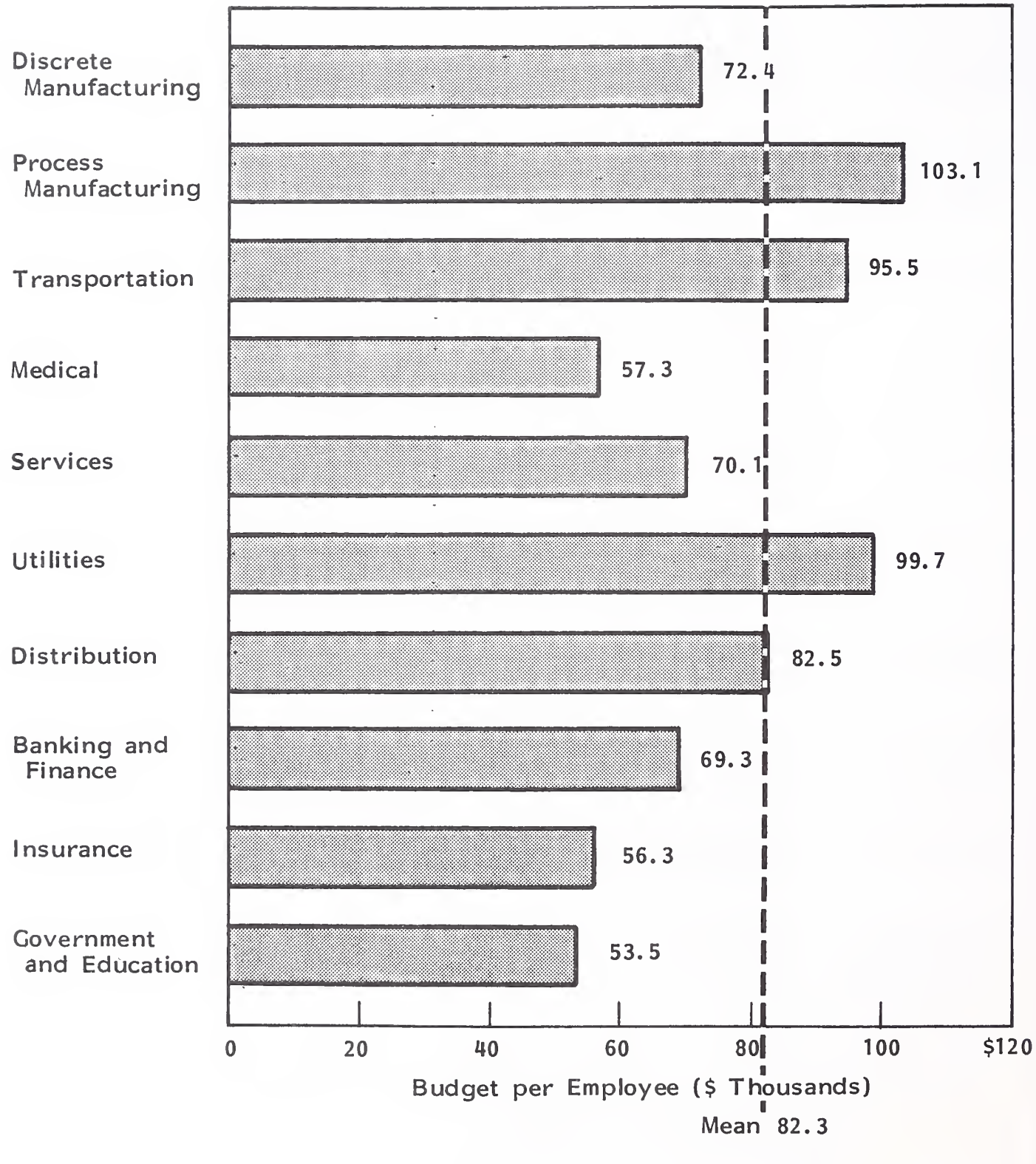


EXHIBIT IV-5

1984 BUDGET PER I.S. EMPLOYEE



- IS budgets are becoming less representative of corporate computing expenditures, as end-user computing increases in importance and users assume more direct control of computing budgets. Corporations must determine an effective way of measuring and controlling these expenditures. IS is the logical conduit for corporate computing expenditures. To date, however, most companies have not established a corporate computing strategy. IS should instigate this planning process before corporate computing expenditures get out of control.

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Issue Types

- Three major types of issues affect IS plans:
  - Problems.
  - Objectives.
  - Changes.
- "Problems" are self-explanatory; they may be internal or external, technical or managerial.
- "Objectives" are the goals toward which IS is heading. An objective may exist because of a problem (e.g., improvement of user relations) or may exist in the absence of a precipitating problem (e.g., development of an office automation plan).
- "Changes" are significant trends that IS managers believe will affect their department in the next three years.

b. Issue Groups

- There are many IS issues. For purposes of analysis and presentation, issues have been grouped into four major areas and seven subgroups. Exhibit IV-6 shows these areas and subgroups, as well as examples of subgroups.

- Several of the major subgroup issues are separately reported and analyzed in the individual industry sector analyses in Chapter V.

c. Methodology

- Survey respondents supplied open-ended responses to questions about what they saw as the most important problems, objectives, and changes facing their organizations. Respondents could supply, in order of importance, as many as three issues in each category. The answers were later coded into groups and subgroups for further analysis.

- Weights were assigned to the respondents. Each weight was multiplied by the number of responses to compute a "raw score" for each subgroup. Then raw scores were accumulated for all companies, and each subgroup's raw score was normalized based upon the total raw score.

  - Each subgroup's raw score was calculated as a percentage of the total raw score.

  - For each industry sector, a similar calculation was made that reflects the relative importance of the issue group within that sector.

- These subgroup percentages have been added together to obtain an index value for an issue group. For example, some IS departments have problems with both users and upper management but others have problems only with users.

EXHIBIT IV-6

INFORMATION SYSTEMS ISSUE AREAS AND GROUPS

ISSUE AREA	ISSUE SUBGROUP	EXAMPLES OF SUBGROUPS
Corporate Relationships	Same	Relations with upper management, relations with users, company objectives
IS Management	Planning and Control	Applications planning, backlog, project control, management techniques, organizational changes, data integrity, documentation
	Personnel	Shortages, turnover, training, recruitment
	Costs	Budgets, cost justification
Technical	Hardware	Operations, capacity management, upgrades, maintenance, security, disaster recovery
	Software	Development, maintenance, upgrades productivity, quality, packages
	Telecommunications	Data and voice networks, equipment planning, security, reliability
	End-User Computing	Office systems, personal computers, information centers
Other	Same	Exogenous factors, competition, new technologies

d. Senior Management Concerns

- The most significant area of concern to senior management is cost. However, other issues are becoming more visible to these managers.

  - The senior manager is defined as the person to whom the head of the IS department reports.

  - Not surprisingly, cost is the top concern to senior managers. But, whereas cost was more than six times as significant as other issues last year, it was only 20% greater in significance than planning and control issues. Senior managers are becoming increasingly aware of data integrity issues as computing enters non-IS offices. Exhibit IV-7 shows the top five senior management concerns.

- In the following sections, IS management's problems, objectives, and issues on significant changes affecting their departments are analyzed. Cost is not directly addressed by IS management through its objectives, nor is it perceived as a top problem. This inconsistency between the concerns of senior management and IS management may be the source of many of the conflicts that arise between these two groups.

e. Information Systems Problems

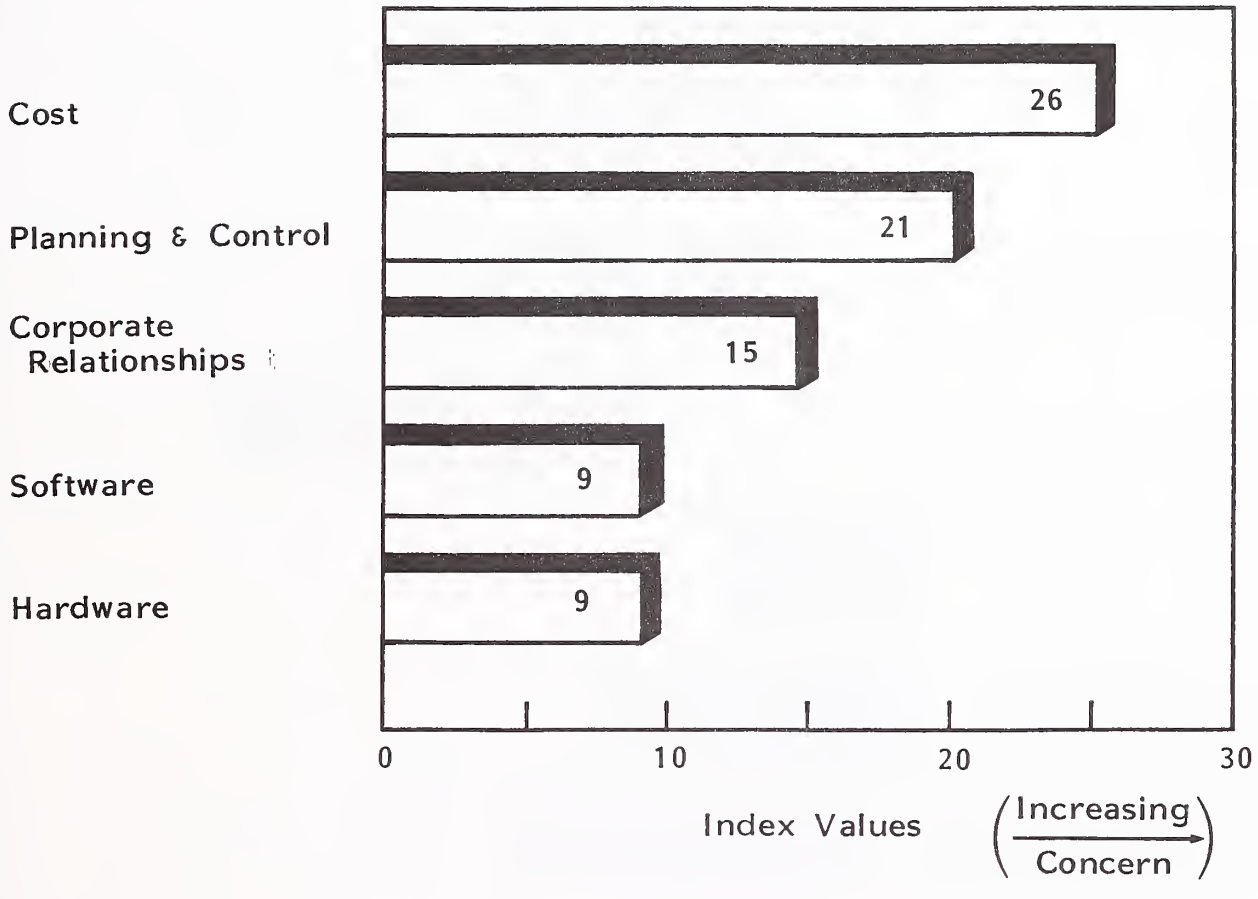
- For all organizations, the relative importance of the problem groups is similar and has not changed significantly since last year. Exhibit IV-8 shows the relative importance of information system problems during this year's survey.

  - However, there are usually quite large variations in relative importance from sector to sector.

  - Software, planning and control, and hardware are viewed as top IS problems.

EXHIBIT IV-7

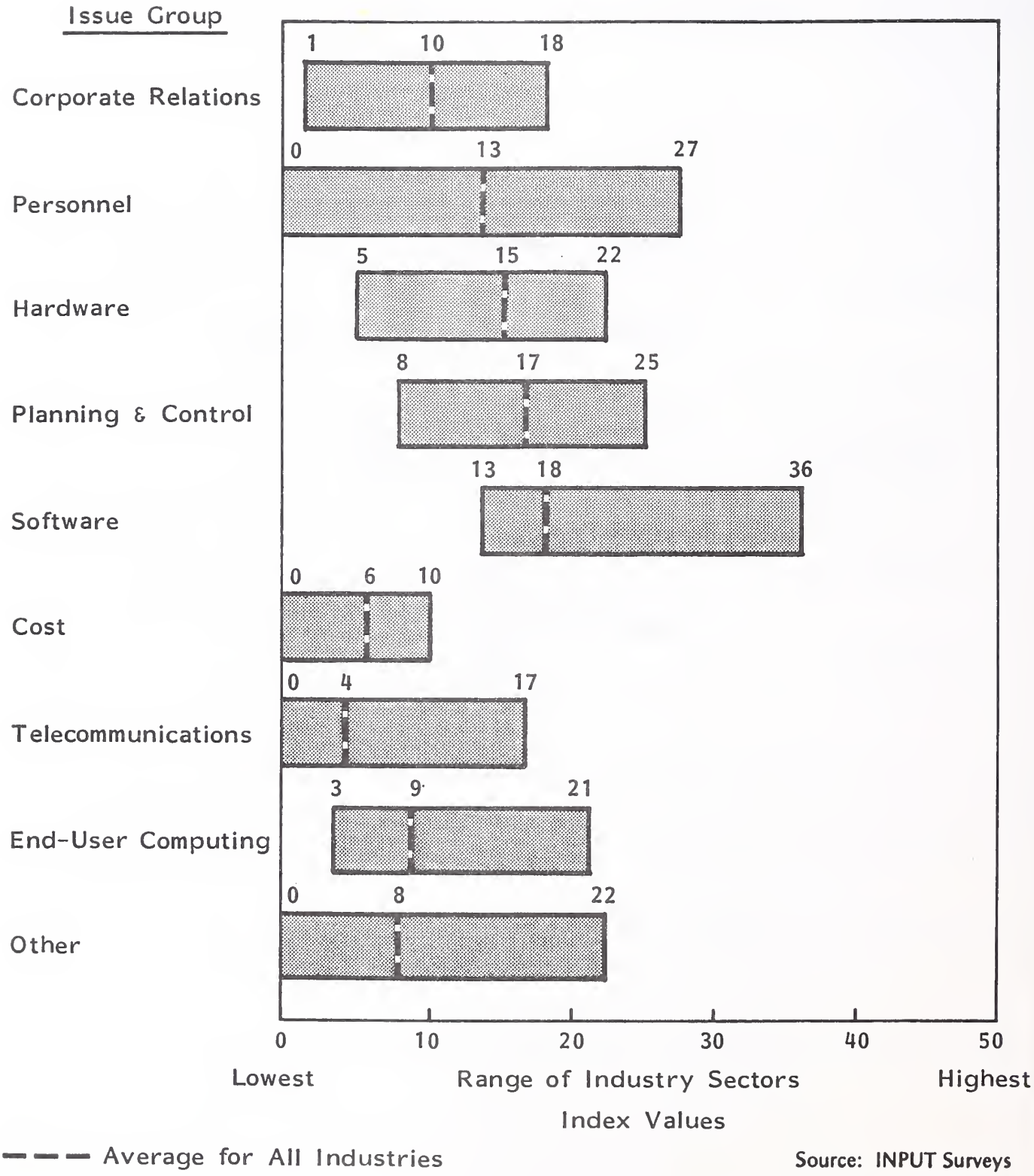
TOP FIVE SENIOR MANAGEMENT CONCERNS



Source: INPUT Survey

EXHIBIT IV-8

RELATIVE IMPORTANCE OF
INFORMATION SYSTEMS PROBLEMS



Source: INPUT Surveys

- Costs, telecommunications, and end-user computing are not considered to be major problems.

- Exhibit IV-9 shows the actual problem index values for all organizations and for each industry sector.

- Company/division size in some cases does have an impact on the relative importance of problems, as shown in Exhibit IV-10.

  - Large companies, not unexpectedly, have significant problems with planning and control, and personnel. They have relatively fewer perceived problems in software and cost-related issues.

  - Large companies also have relatively more problems with exogenous factors such as the AT&T divestiture, governmental compliance, and new technologies (categorized in the "Other" issue group).

  - Medium-sized companies, in contrast with other company size groups, are more concerned with the rudimentary industry issues of hardware and software.

f. Objectives

- Objectives are similar in relative importance to problems, except in the areas of personnel, software, and end-user computing. Details are shown in Exhibits IV-11 and IV-12.

- Personnel problems are not usually included as formal objectives in most companies. This is due in part to the low priority assigned to personnel issues and the difficulty of achieving the few objectives that are established.

  - Reduced turnover may be easily measured but difficult to achieve.

EXHIBIT IV-9

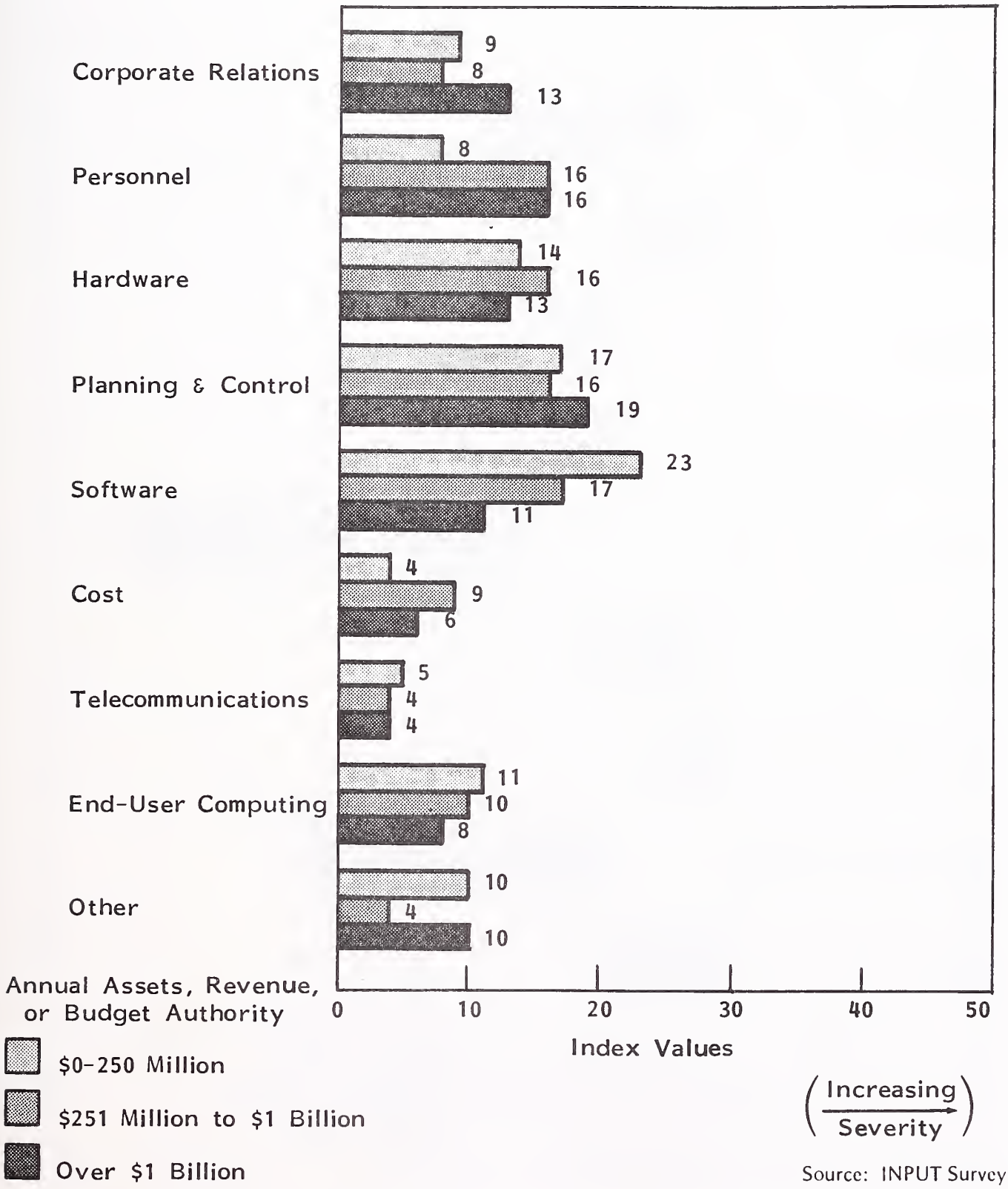
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS
BY INDUSTRY SECTOR (Index Values)

	CORPORATE RELATIONSHIPS	PERSONNEL	HARDWARE	PLANNING & CONTROL	SOFTWARE	COSTS	TELECOMMUNI-CATIONS	END-USER COMPUTING	OTHER
Discrete Manufacturing	11	10	13	25	13	10	4	7	8
Process Manufacturing	9	19	10	25	16	8	5	5	3
Transportation	10	2	16	19	14	6	3	13	17
Utilities	11	9	22	23	20	4	0	7	5
Banking and Finance	18	13	15	14	15	6	1	9	10
Insurance	10	27	5	12	17	8	9	9	3
Distribution	6	14	16	19	25	6	3	3	0
Services	1	11	18	9	18	1	5	15	22
Government & Education	8	9	9	8	16	8	17	21	0
Medical	12	0	15	10	36	0	0	13	14
All	10	13	15	17	18	6	4	9	8

Note: The larger the index values, the greater the importance.

EXHIBIT IV-10

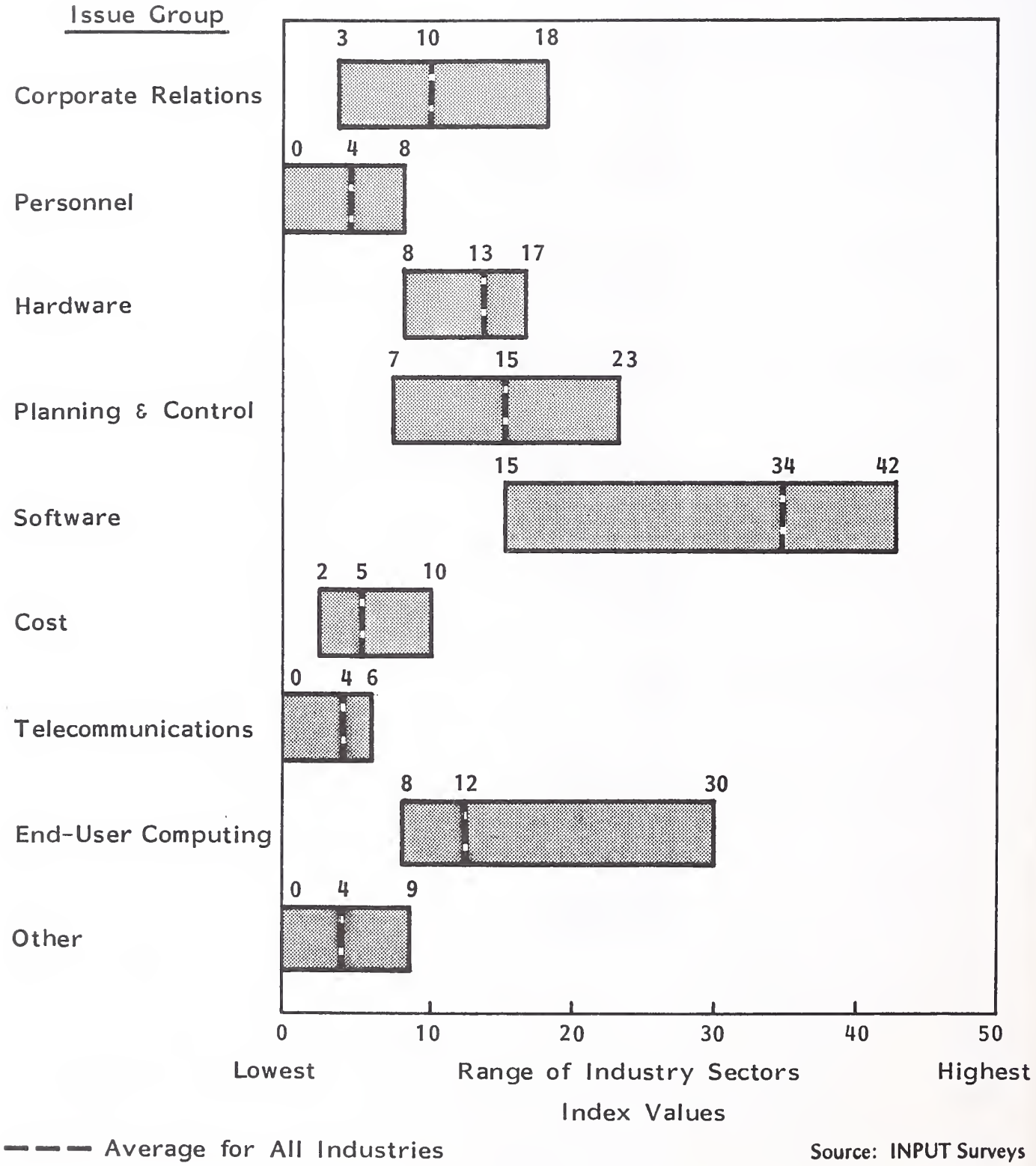
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS
BY COMPANY SIZE



Source: INPUT Surveys

EXHIBIT IV-11

RELATIVE IMPORTANCE OF
INFORMATION SYSTEMS OBJECTIVES



Source: INPUT Surveys

EXHIBIT IV-12

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES
BY INDUSTRY SECTOR (Index Values)

	CORPORATE RELATIONSHIPS	PERSONNEL	HARDWARE	PLANNING & CONTROL	SOFTWARE	COSTS	TELECOMMUNI-CATIONS	END-USER COMPUTING	OTHER
Discrete Manufacturing	18	3	16	8	35	3	6	8	3
Process Manufacturing	3	7	8	20	41	5	3	8	5
Transportation	11	6	10	11	28	3	0	30	0
Utilities	4	2	17	23	29	6	0	11	8
Banking and Finance	10	5	17	16	15	10	5	17	5
Insurance	12	0	11	7	38	8	4	16	3
Distribution	7	8	12	20	37	2	3	8	3
Services	10	2	14	9	33	6	4	13	9
Government & Education	14	0	12	22	32	3	6	10	0
Medical	10	0	14	8	42	2	0	18	6
All	10	4	13	15	34	5	4	12	4

Note: The larger the index values, the greater the importance.

- Increased training of personnel is laudable, but unfortunately it is a low-priority objective.

- There is an uncertainty as to the effect the end-user revolution will have on staffing skills mix. Despite this uncertainty, IS managers are still planning for 40% of their staff to be programmers/analysts in the next three years. INPUT's August 1984 report, Future Skill Requirements for Software Development, will discuss IS personnel needs for this period.

- Software is in the opposite position, having objectives that are considered to be more important than related problems.

  - Software is an action area for most companies. Exhibit IV-12 indicates that software has consistently high index values for nearly all sectors.

  - Most IS managers view themselves as being in the software business. This can be a harbinger of future problems since IS becomes the conduit of corporate information. In fact, IS is in the service business.

- The relative importance of company objectives does not vary significantly with company size, except for corporate relations and software, as shown in Exhibit IV-13. Large companies place greater importance on corporate relations and less importance on software.

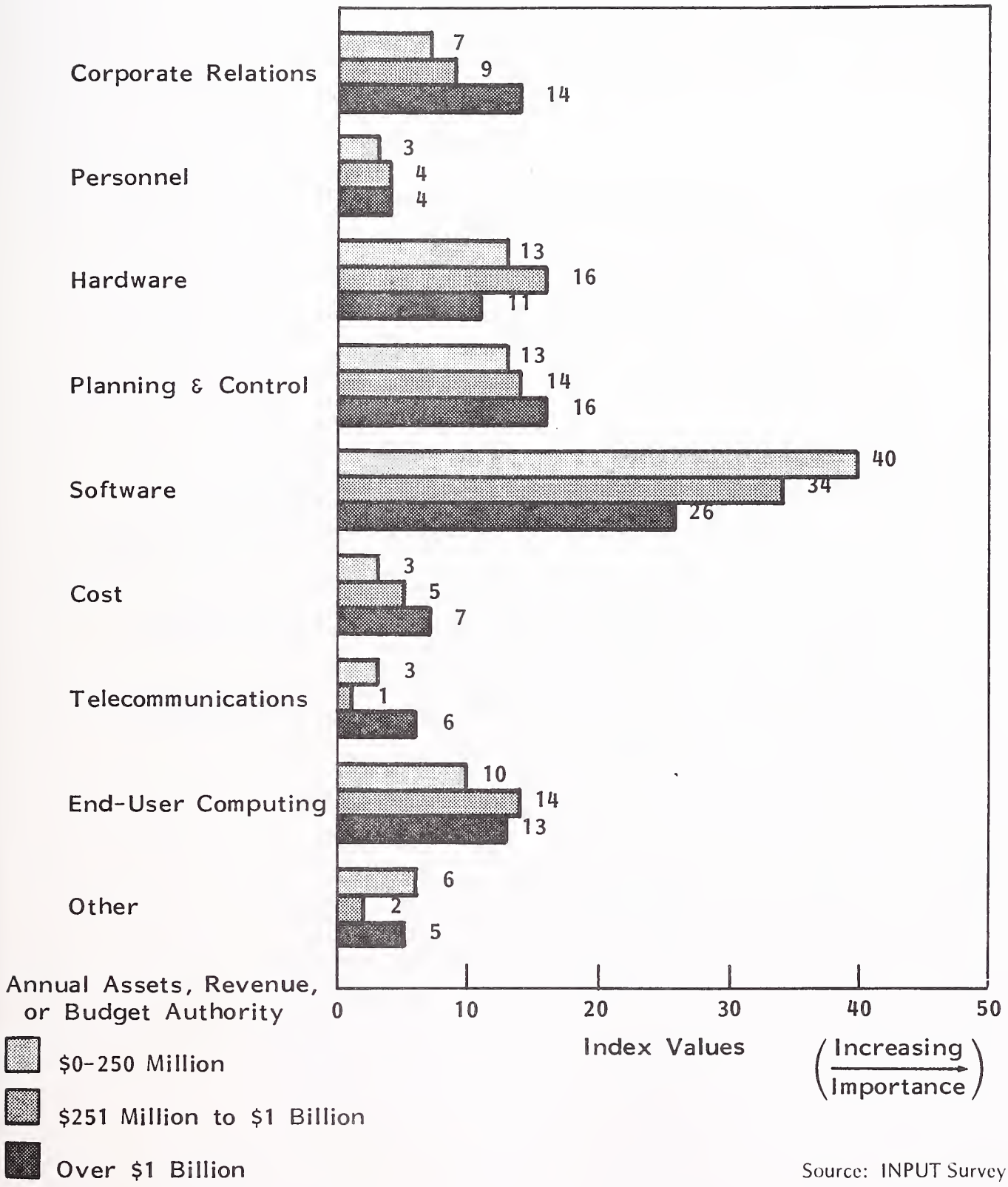
g. Changes and Analysis

- Exhibit IV-14 shows the issues that IS managers believe will have the most significant effect on their departments.

  - End-user computing will have the most dramatic effect on IS. Much of this concern is for the trespassing of corporate computing on IS' domain.

EXHIBIT IV-13

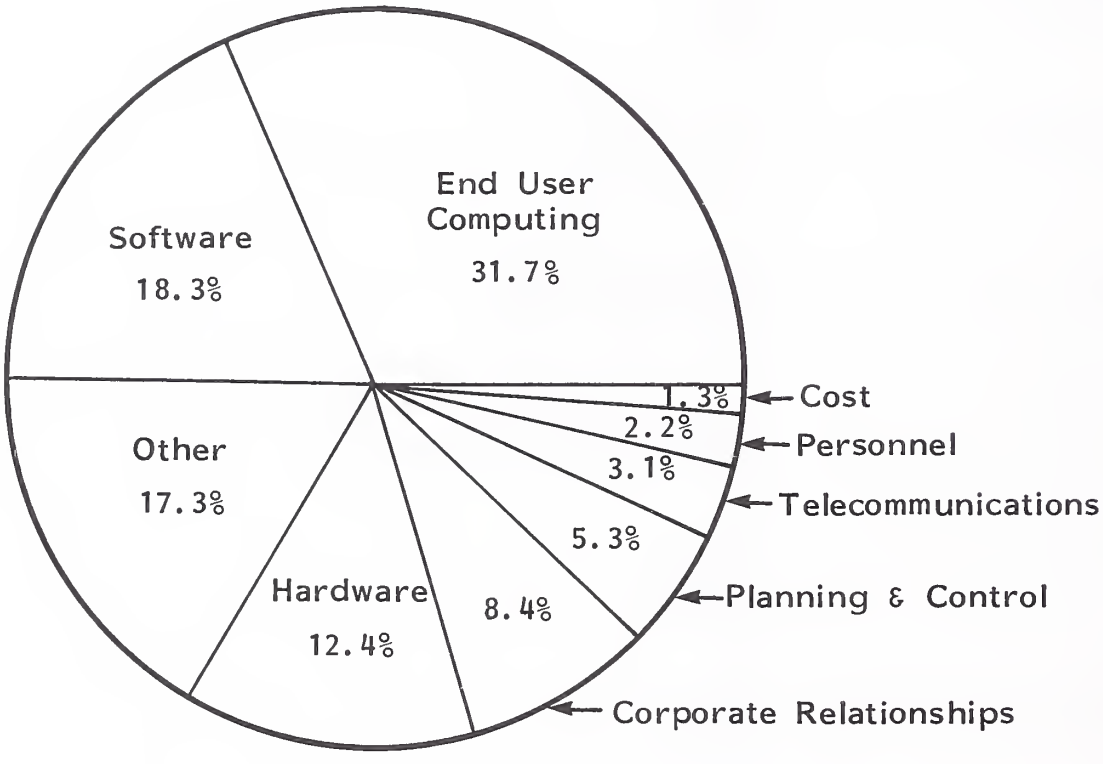
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES BY COMPANY SIZE



Source: INPUT Surveys

EXHIBIT IV-14

MOST SIGNIFICANT CHANGES AFFECTING I.S.



- The visibility that end-user computing presents to senior management is also a concern.

- Another major concern is the potential impact of the central host computing resource. This is evidenced by the above-average growth of mass storage devices in the survey group. (Refer to Exhibit IV-3, earlier in this chapter.)

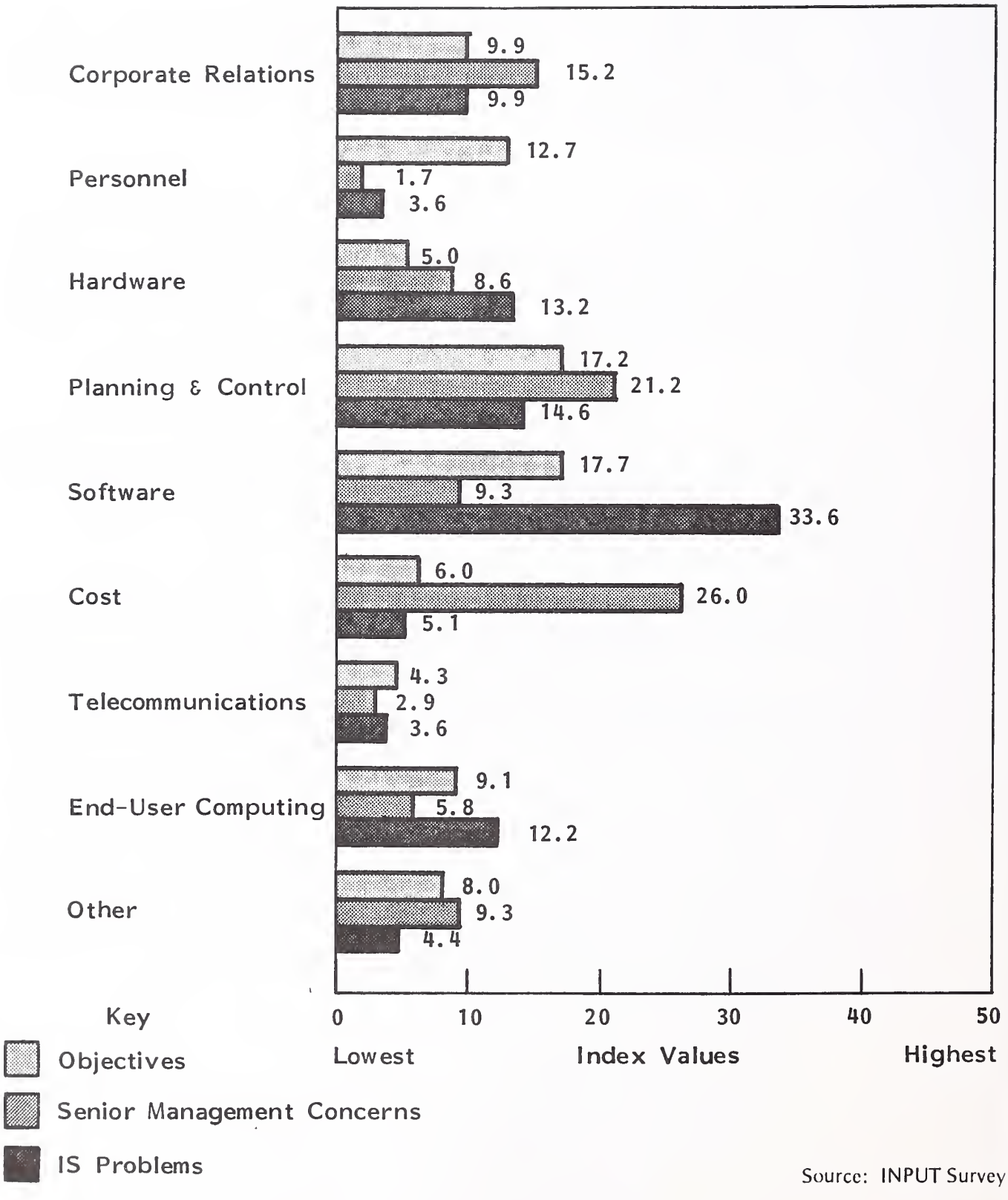
- Exhibit IV-15 contrasts objectives to problems and senior management concerns. Software (especially application development) dominates objectives; cost and planning and control dominate senior management concerns. Major IS problems are in the software, planning and control, and hardware issues.

- For the most part, IS' objectives do not match senior management's as well as they do IS' own problem areas. This emphasizes a software mentality that may prove to be a strategic weakness of IS in the future.

- This strategic problem is reinforced when significant changes affecting IS are also considered. Exhibit IV-16 shows issues in decreasing order of objective priority. The importance of these issues as problems, senior management concerns, and changes is also recorded, and issues of high and very high importance are highlighted. Whether viewing these as senior management concerns, current IS problems, or future IS concerns, the objectives are not well aligned. This indicates that IS may not be planning properly and is not communicating the importance of software issues to senior management. Instead of addressing long-term issues and anticipating problems, IS is continuing the reactive, business-as-usual approach. IS must realize software is no longer the only issue.

EXHIBIT IV-15

OBJECTIVES VERSUS I.S.
SENIOR MANAGEMENT CONCERNS AND PROBLEMS



Source: INPUT Surveys

EXHIBIT IV-16

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	Very High	Medium	Low	Medium
Planning & Control	Medium	Medium	High	Low
Hardware	Medium	Medium	Low	Medium
End-User Computing	Medium	Low	Low	Very High
Corporate Relations	Medium	Medium	Medium	Low
Cost	Low	Low	High	Low
Personnel	Low	Medium	Low	Low
Telecommunication	Low	Low	Low	Low
Other	Low	Low	Low	Medium

3. APPLICATION DEVELOPMENT

- Internally developed systems are almost evenly divided between industry-specific and cross-industry applications. This division has remained static over the past three years. What has changed is the increase in development with end users and the use of fourth-generation languages to reduce the programming backlog.

  - The backlog is still present in most organizations, but its prominence as a major problem has diminished in previous years.

  - The majority of end-user computing has been directed at the "hidden" backlog of information services needs. To date, the active end user has been retrieving information ad hoc and/or transferring certain manual functions to intelligent terminals or PCs. There has been no appreciable impact on the backlog of requests for system enhancements.

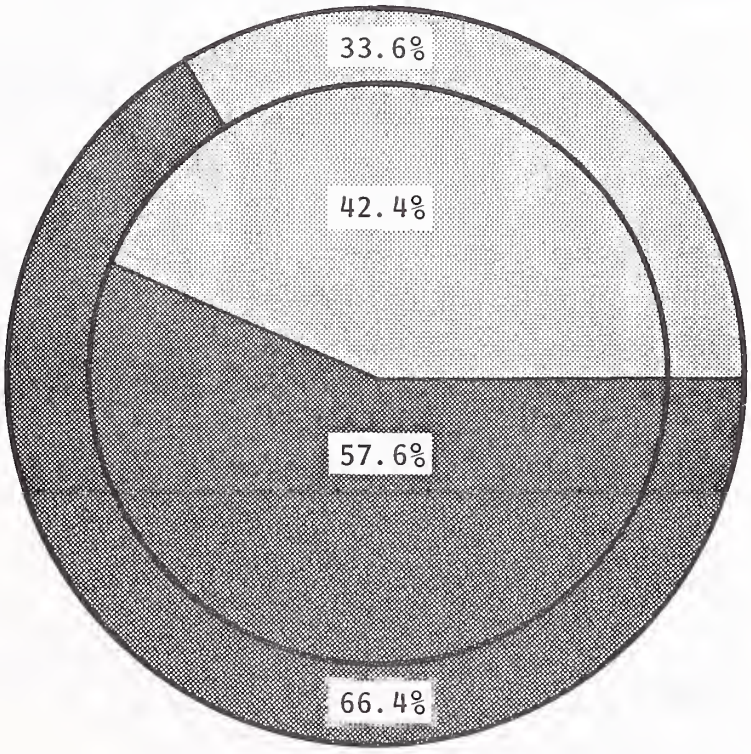
  - The increased participation of end users in development, however, has caused major planning and control problems. This concern has elevated to senior management who, for the first time, consider planning and control issues to be nearly as important as cost. (Refer to Exhibit IV-7 earlier in this chapter.)

- Externally developed systems are used predominantly for cross-industry applications. Exhibit IV-17 shows the distribution between industry-specific and cross-industry applications for both internally and externally developed systems.

- Exhibit IV-18 shows an industry distribution of cross-industry applications. It shows the percentages of internally and externally developed systems by industry for these applications.

EXHIBIT IV-17

TOP I.S. APPLICATIONS
(All Companies)



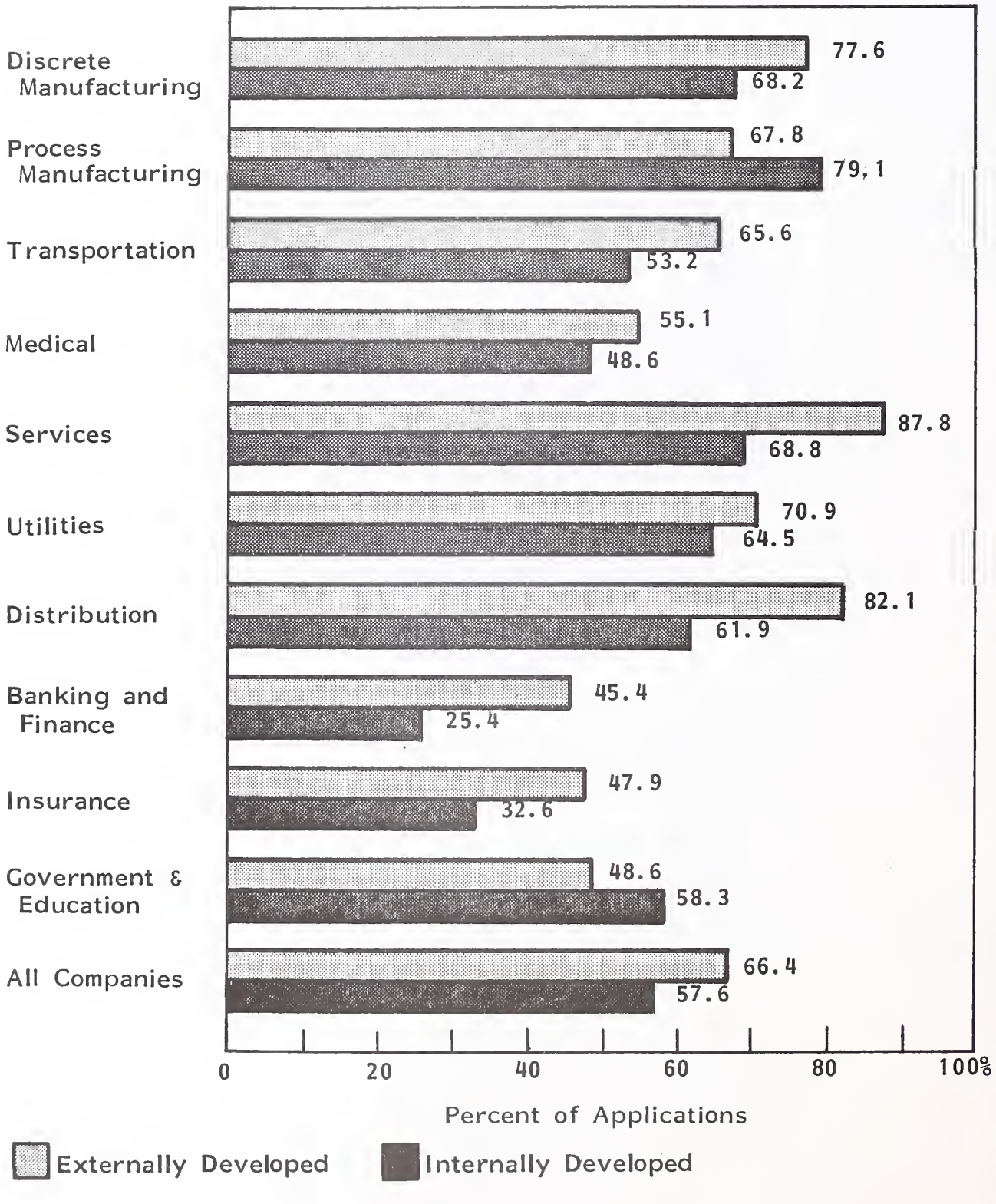
Inside Circle: Internally Developed
Outside Circle: Externally Developed

Industry-Specific Applications

Cross-Industry Applications

EXHIBIT IV-18

DISTRIBUTION OF MOST IMPORTANT CROSS-INDUSTRY INFORMATION SYSTEMS APPLICATIONS
(By Industry)



- Except for banking and finance, insurance, and government and education, the majority of the cross-industry applications are developed and supported externally.

- The banking and finance, insurance, and government and education sectors typically have large IS support organizations and older systems. Thus, the use of external sources for program development and support are used less frequently.

- Exhibit IV-19 shows the top cross-industry applications. Accounting and finance are by far the most common applications for both internal and external development.

  - The first applications implemented have typically been from this group. They include:

    . Accounts receivable.

    . Accounts payable.

    . General ledger.

    . Cost accounting.

    . Order entry.

    . Budgeting.

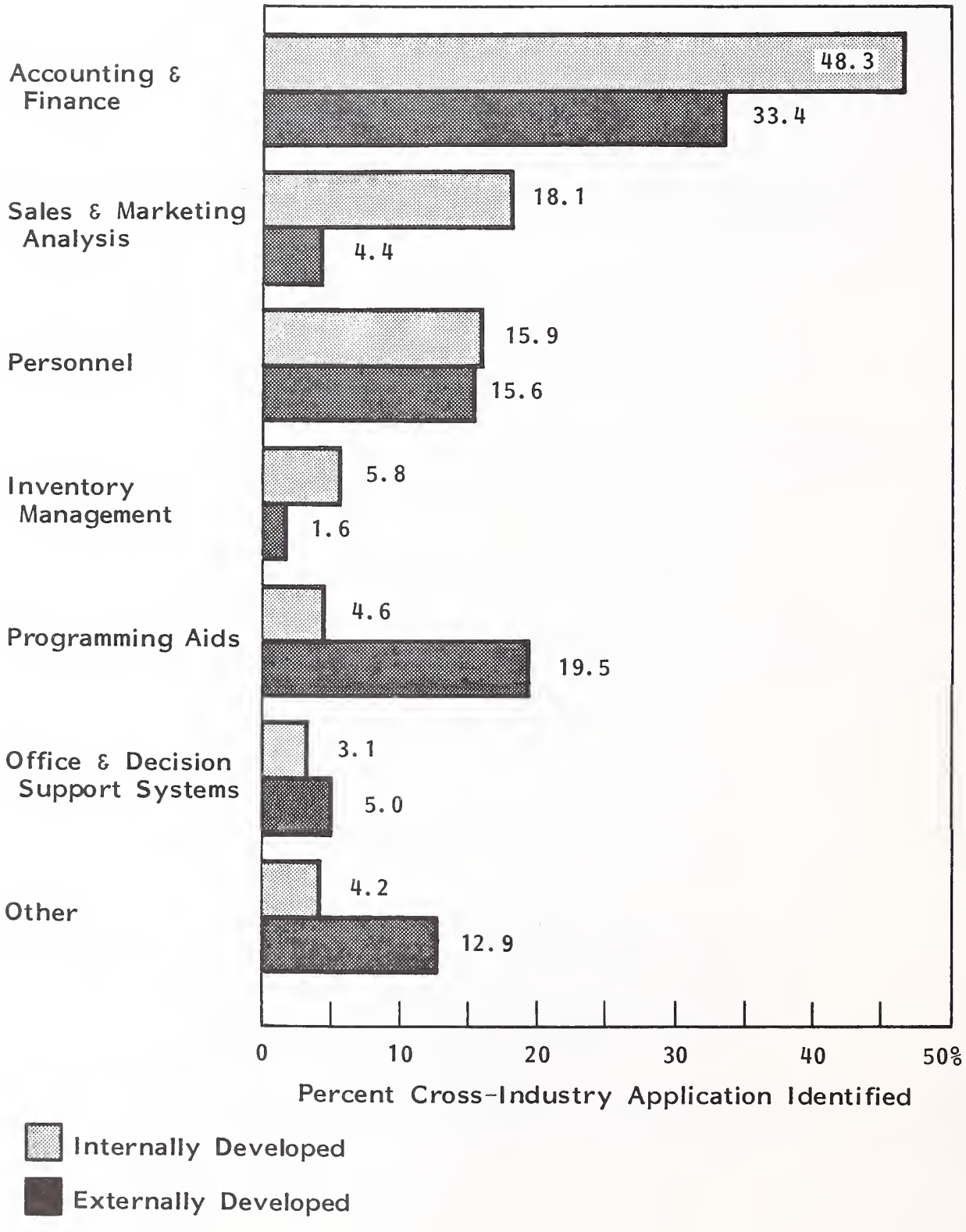
  - With the advent of personal computers and their prominent use of spreadsheets for financial analysis, this trend should continue.

- Chapter V discusses industry-specific topics and will include an analysis of the top internal and external applications used in each sector.

EXHIBIT IV-19

TOP CROSS-INDUSTRY APPLICATIONS

(All Companies)



V INDUSTRY SECTOR ANALYSIS

V INDUSTRY SECTOR ANALYSIS

A. INTRODUCTION

- This chapter presents a summary of the Annual Survey's findings for each industry. Appendix A provides the distribution of respondents by industry, and Appendix B contains a copy of the Annual Survey.

- The following topics will be discussed for each industry:

  - IS budgets.

  - IS managers' planning issues.

  - IS applications development.

B. DISCRETE MANUFACTURING SECTOR

1. BUDGET ANALYSIS

- Ninety percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Seven percent expect budgets to remain the same, and 3% expect decreases.

- The average budget growth expected in 1985 is 13%.
  - In 1984 budget growth was 6%.
  - The expected budget growth in 1985 for all industries is 11%.
- Exhibit V-1 shows the distribution of expenses in discrete manufacturing information systems budgets.
- The discrete manufacturing sector budget breakdown closely parallels the average of all industries.
  - At 41%, personnel expenses dominate the budget.
  - Hardware expenses are the next largest, at 27%, followed by software at 10%.
- The largest increase in expenditures expected in 1985 is in minicomputers, which should go up 20%.
  - This is similar to the industry composite, where the biggest increase (18%) is in microcomputers. The similarity exists because of the ever-increasing performance of the "micro" approaching that of minicomputers.
  - Microcomputer and mass storage device expenses are also expected to increase about 11%.
- Information systems budgets as a percent of total discrete manufacturing corporate revenue is 0.7%. This is about the same as the 0.8% average for all industries.

EXHIBIT V-1

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE DISCRETE MANUFACTURING SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	40.9%	7.7%
Mainframe Processors	12.2	5.3
Minicomputers	3.3	19.5
Microcomputers	0.8	10.9
Mass Storage Devices	3.4	11.3
Terminals	4.0	1.3
Peripherals	3.6	(0.5)
Total Hardware	27.3%	6.0%
Communications	6.9	7.7
External Software	4.3	7.5
Custom Programming	3.9	7.1
Integrated Systems	1.9	0.0
Total Software	10.1%	5.9%
Software Maintenance	0.8	9.8
Hardware Maintenance	4.8	13.2
Total Maintenance	5.6%	12.7%
Outside Processing Services	5.8	6.3
Other	3.4	5.2
Total	100.0%	13.3%

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Concern about information systems issues expressed by senior discrete manufacturing executives closely parallels that for other sectors, as shown in Exhibit V-2.

  - Planning and control are the dominant issues for senior management.

  - Cost is also an important consideration as usual.

b. Problems

- Senior IS managers in the discrete manufacturing sector consider planning and control their number one problem, as shown in Exhibit V-3. Backlog scores especially high as a planning concern.

- Software and hardware are also regarded as major problems by discrete manufacturing IS managers. Hardware rates third in importance as an objective, whereas software is the most important objective. Within software, applications development and data integrity are of highest concern to IS managers.

- Telecommunications issues cause the industry the least concern.

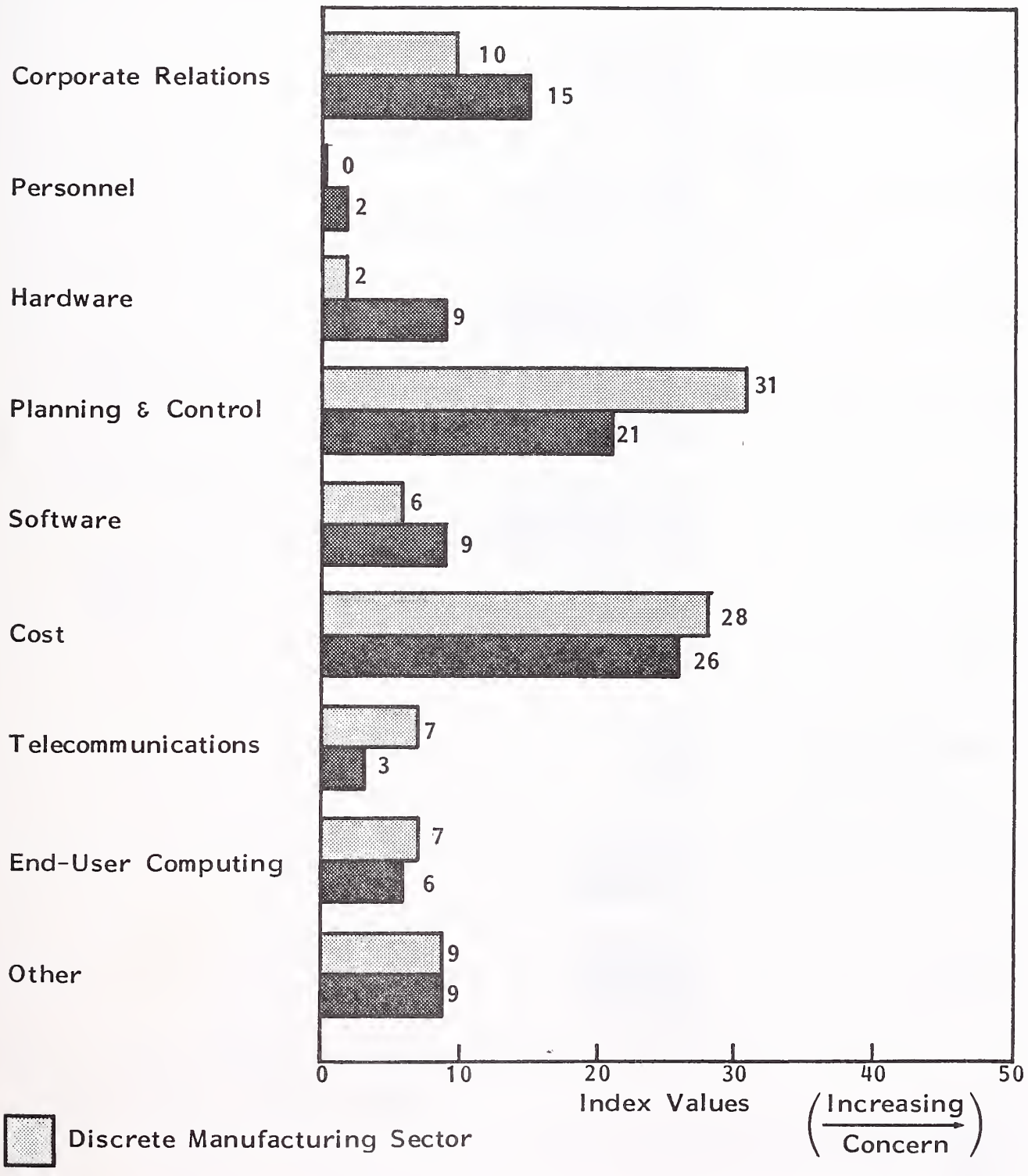
- Exhibit V-4 shows the planning issue subgroups that were rated as top problems in this sector.

c. Objectives

- Accomplishment of software objectives is extremely important to discrete manufacturers; the next most important objectives, those dealing with corporate relationships, are rated only half as high, as shown in Exhibit V-5.

EXHIBIT V-2

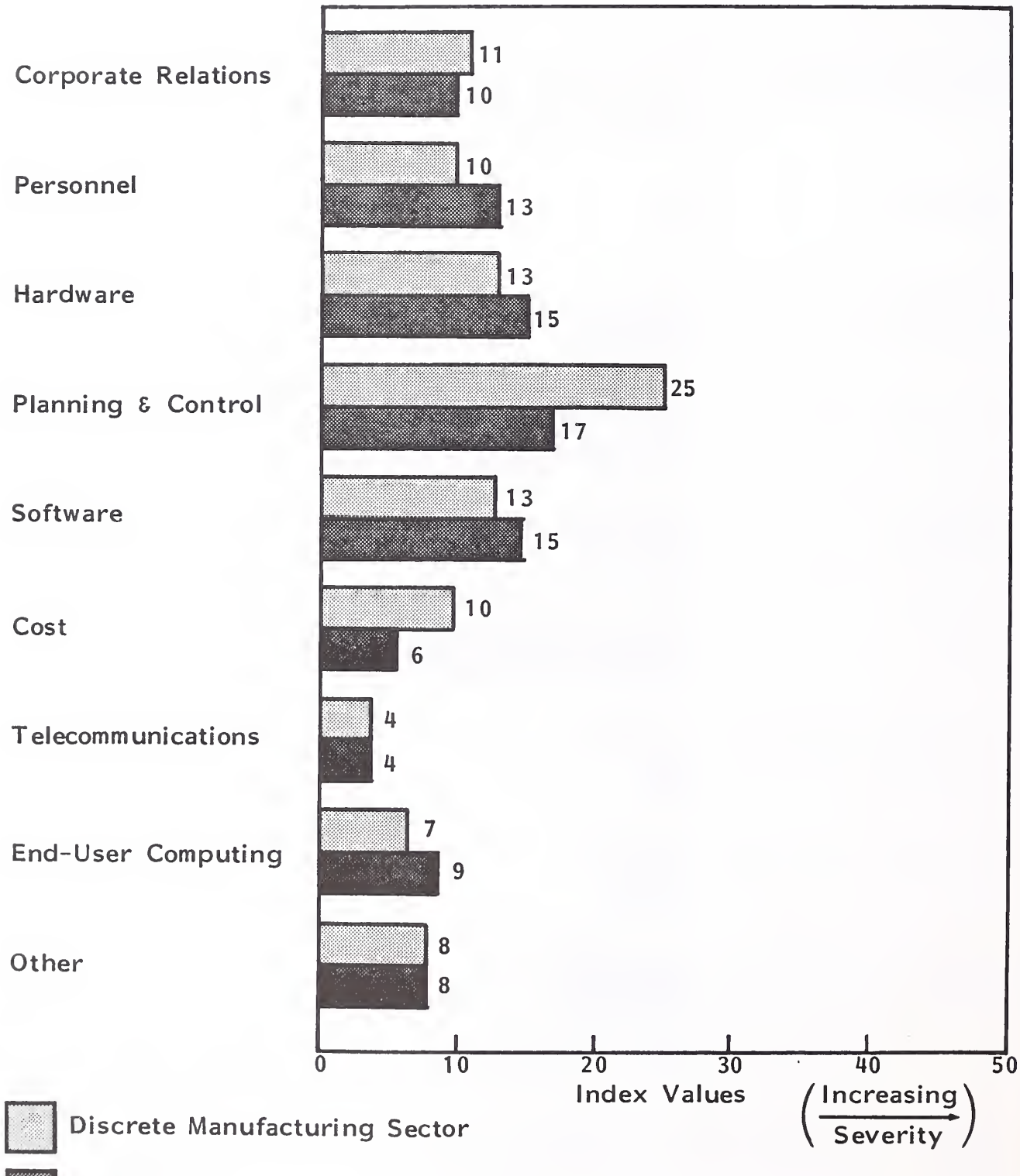
RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE DISCRETE MANUFACTURING SECTOR



Source: INPUT Survey

EXHIBIT V-3

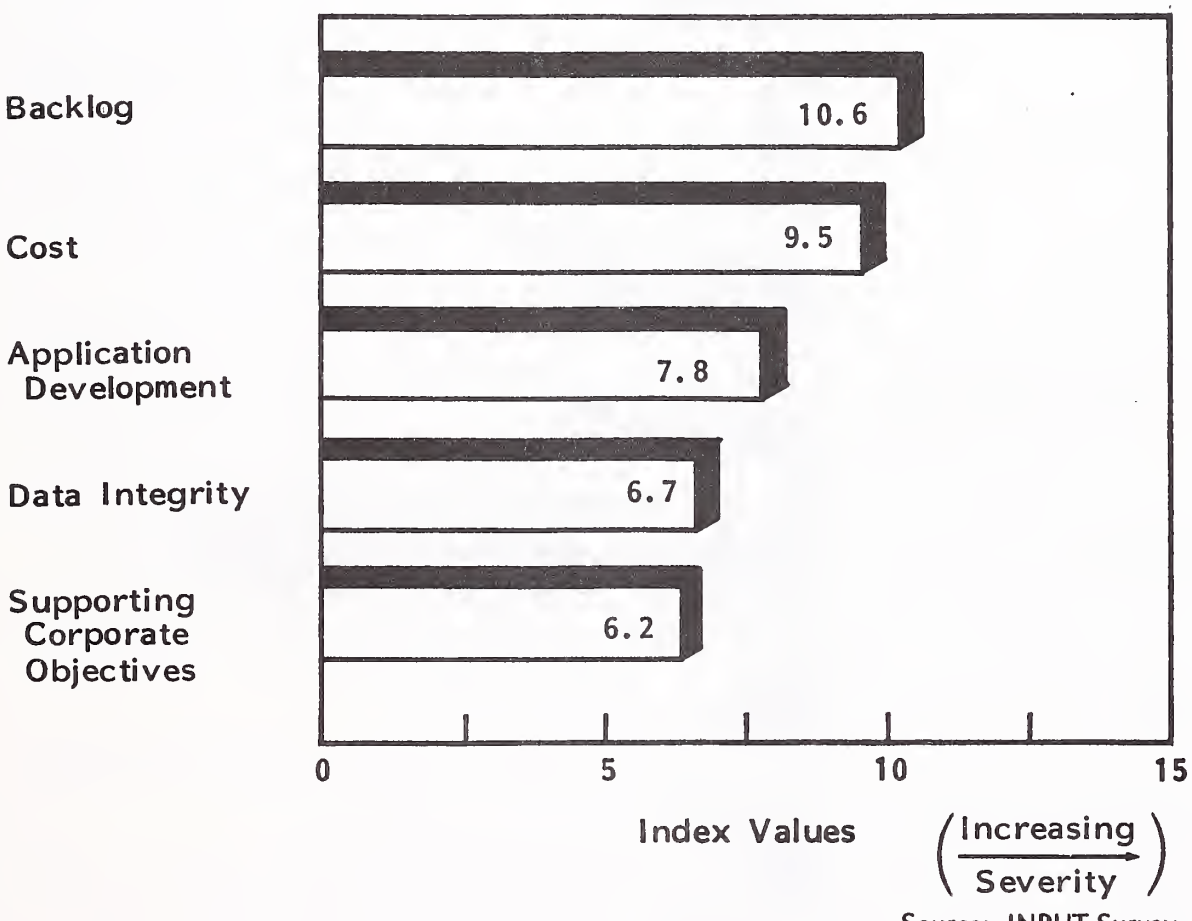
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE DISCRETE MANUFACTURING SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-4

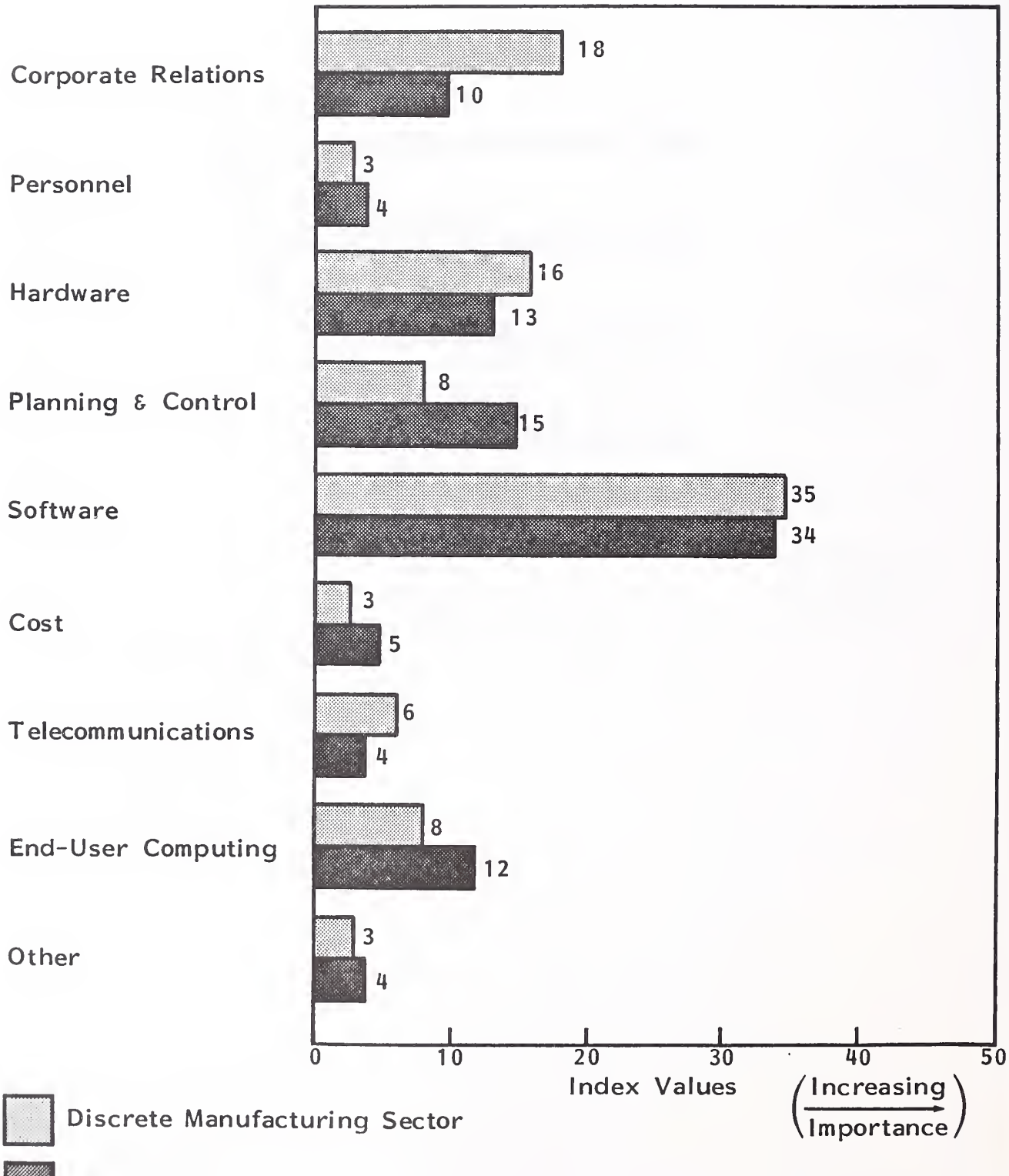
TOP FIVE INFORMATION SYSTEMS
PROBLEMS FOR THE DISCRETE MANUFACTURING SECTOR
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-5

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE DISCRETE MANUFACTURING SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Accomplishment of software applications objectives is rated especially high.

- Within the corporate relationships category, managers express the greatest interest in user relations objectives.

- Hardware objectives, especially those dealing with upgrades, are also rated high.

- Cost and personnel objectives are rated lowest.

- Exhibit V-6 contains the top objectives for this sector at the issue subgroup level of detail.

- Exhibit V-7 lists the issue groups in descending order of priority for objectives set by IS managers in discrete manufacturing. These are compared to IS problems, senior management concerns, and the significance of the issues as an area of change in the next three years. The discrete manufacturing IS managers do not adequately match objectives to problems and areas of change since all problems, concerns, and changes that had high or very high importance were supported by low-priority objectives.

3. APPLICATIONS

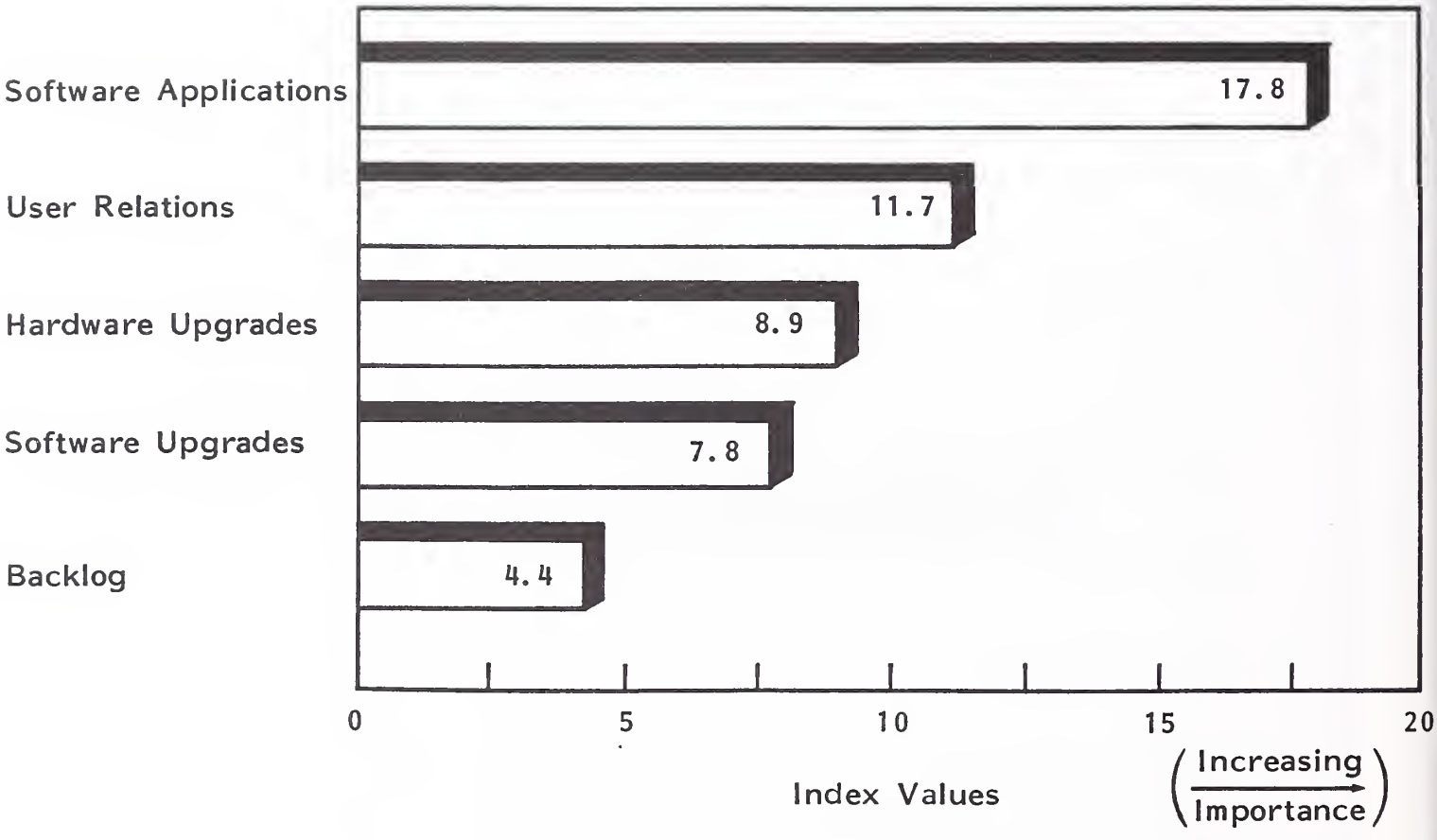
- The top five IS applications planned by managers in the discrete manufacturing industry are shown in Exhibit V-8 for internally developed and supported applications and in Exhibit V-9 for external applications.

  - Twenty-two percent of the internal applications are specific to the discrete manufacturing sector.

  - Thirty-two percent of the external applications are industry specific.

EXHIBIT V-6

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE DISCRETE MANUFACTURING INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

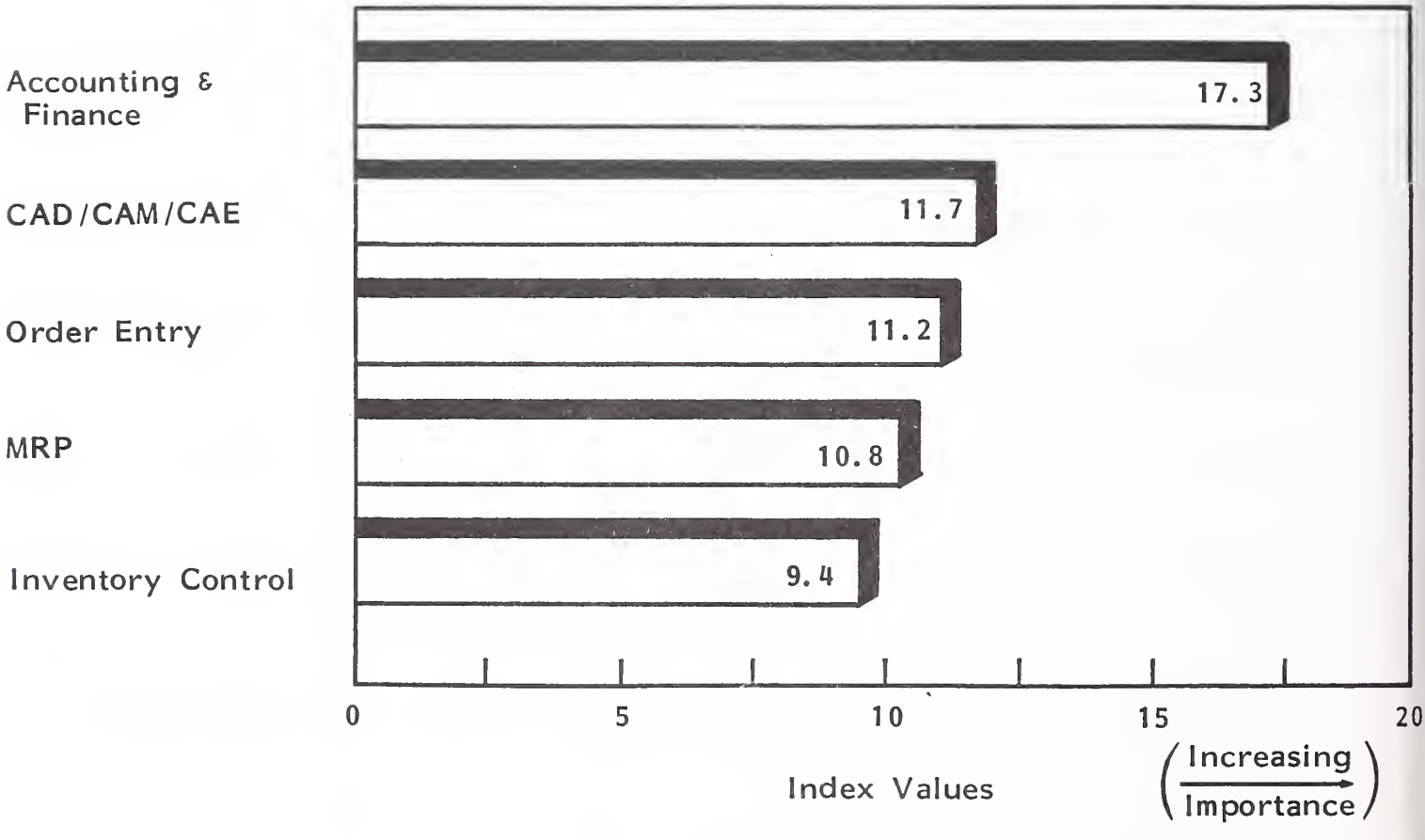
EXHIBIT V-7

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES
FOR THE DISCRETE MANUFACTURING SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	Very High	Medium	Low	Medium
Corporate Relationships	Medium	Medium	Medium	Low
Hardware	Medium	Medium	Low	Medium
Planning & Control	Low	High	Very High	Low
End-User Computing	Low	Low	Low	Very High
Telecommunications	Low	Low	Low	Low
Cost	Low	Medium	High	Low
Personnel	Low	Medium	Low	Low
Other	Low	Low	Low	High

EXHIBIT V-8

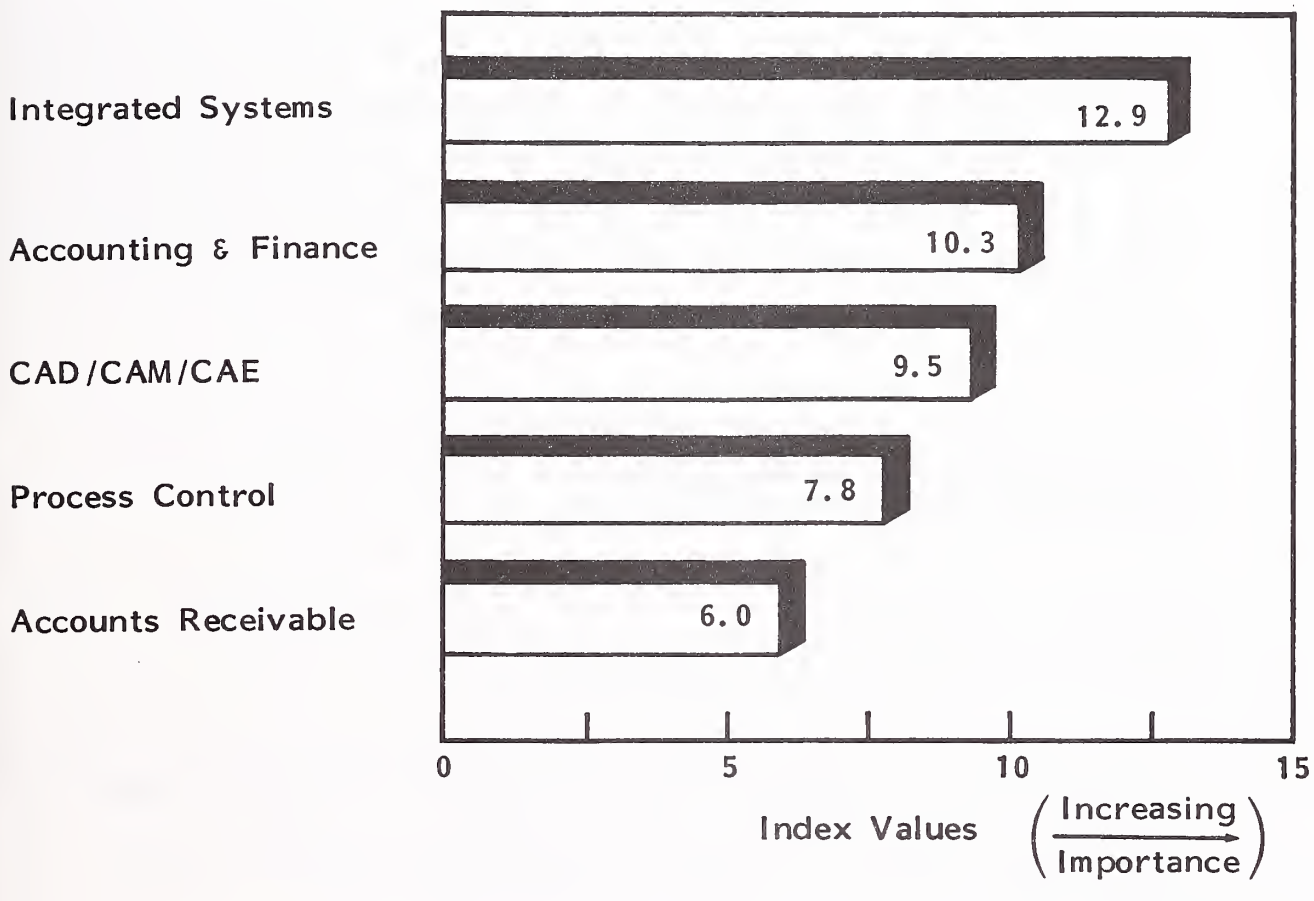
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE DISCRETE MANUFACTURING INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-9

RELATIVE IMPORTANCE OF TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE DISCRETE MANUFACTURING INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- The most important applications that are internally supported are accounting and finance, CAD/CAM/CAE, and order-entry applications.
  - This year CAD/CAM/CAE applications replaced materials requirements planning (MRP) as second in importance.
  - This year inventory control was added to the list of important internally supported applications.
- Integrated systems were the most important externally developed applications for the discrete manufacturing sector. Accounting and finance applications and CAD/CAM/CAE applications were second and third in importance, respectively. Process control was mentioned by many of the respondents in the discrete manufacturing sector as being an important externally developed application.

C. PROCESS MANUFACTURING SECTOR

1. BUDGET ANALYSIS

- Ninety percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Ten percent expect budgets to remain the same, and 3% expect decreases.
- The average budget growth expected in 1985 is 8%.
  - In 1984 budget growth was 5%.
  - The expected budget growth in 1985 for all industries is 11%.

- Exhibit V-10 shows the distribution of expenses in process manufacturing IS budgets.

- The process manufacturing sector budget breakdown is similar to the average for all industries.

  - At 35%, personnel expenses dominate the budget.

  - Hardware expenses, at 32%, are the next largest, followed by communications at 12%.

- The largest nonmaintenance increase in expenditures expected in 1985 is in minicomputer purchases, which should go up 23%.

  - This is in marked contrast to the industry composite, where the biggest increase (18%) is in microcomputers.

  - Communication and mass storage device expenses are also expected to increase significantly, at 9% and 11% respectively.

- Information systems as a percent of total process manufacturing corporate revenue is 0.9%--about the same as the 0.8% average for all industries.

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Planning and control issues are of most concern to senior process manufacturing executives, as shown in Exhibit V-11. Senior executives are very concerned about data integrity issues within the planning and control issue group.

- Cost is also a very significant concern to process manufacturing executives.

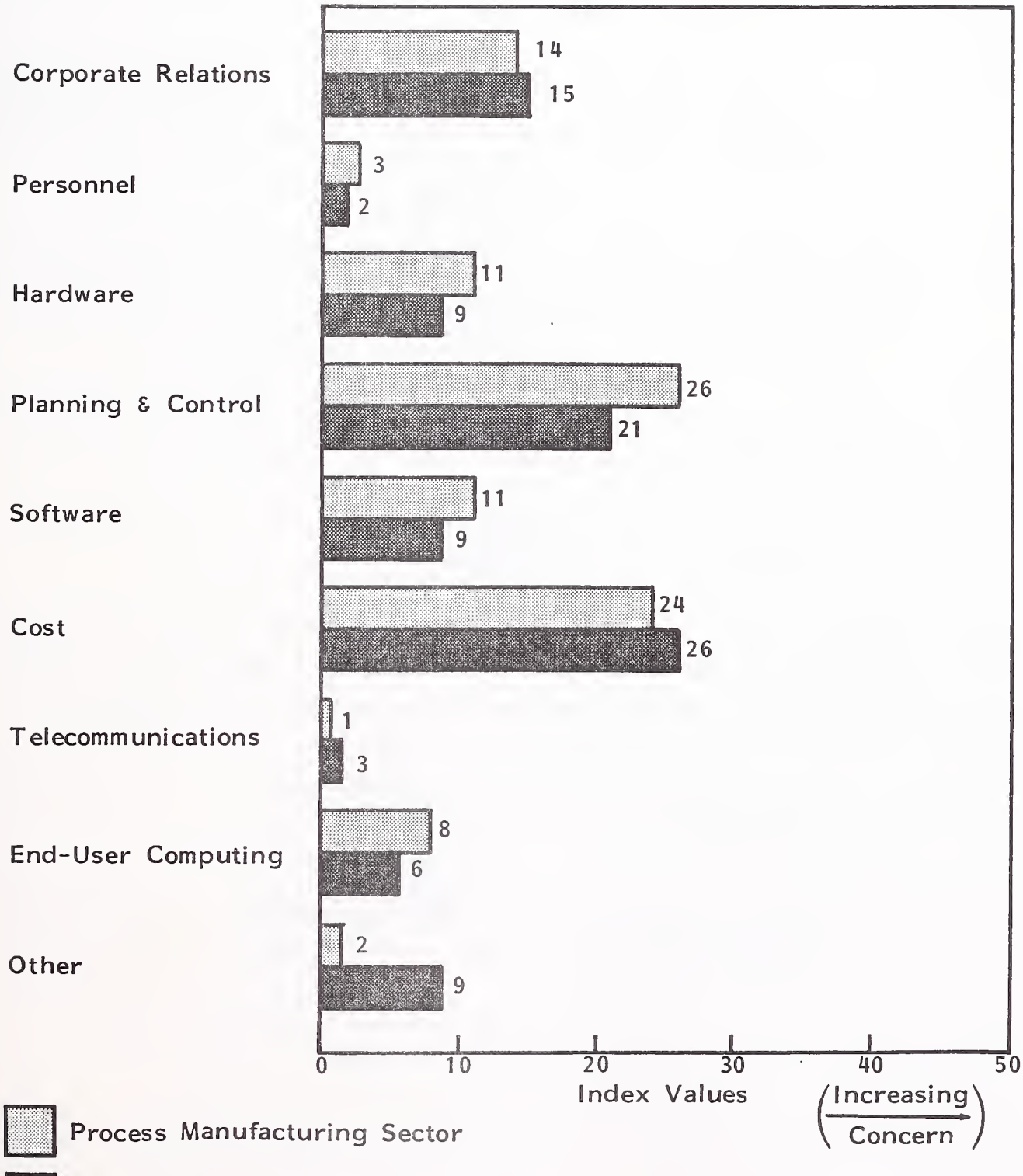
EXHIBIT V-10

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE PROCESS MANUFACTURING SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	34.9%	6.8%
Mainframe Processors	16.1	3.1
Minicomputers	1.5	22.6
Microcomputers	0.8	9.5
Mass Storage Devices	9.9	10.9
Terminals	3.8	(1.4)
Peripherals	0.3	0.9
Total Hardware	32.4%	8.7%
Communications	11.7	9.4
External Software	6.8	7.8
Custom Programming	2.7	(4.4)
Integrated Systems	0.6	0.0
Total Software	10.1%	5.0%
Software Maintenance	0.4	2.3
Hardware Maintenance	5.0	24.1
Total Maintenance	5.4%	22.5%
Outside Processing Services	0.8	4.5
Other	4.7	3.5
Total	100.0%	8.2%

EXHIBIT V-11

RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE PROCESS MANUFACTURING SECTOR



Source: INPUT Survey

b. Problems

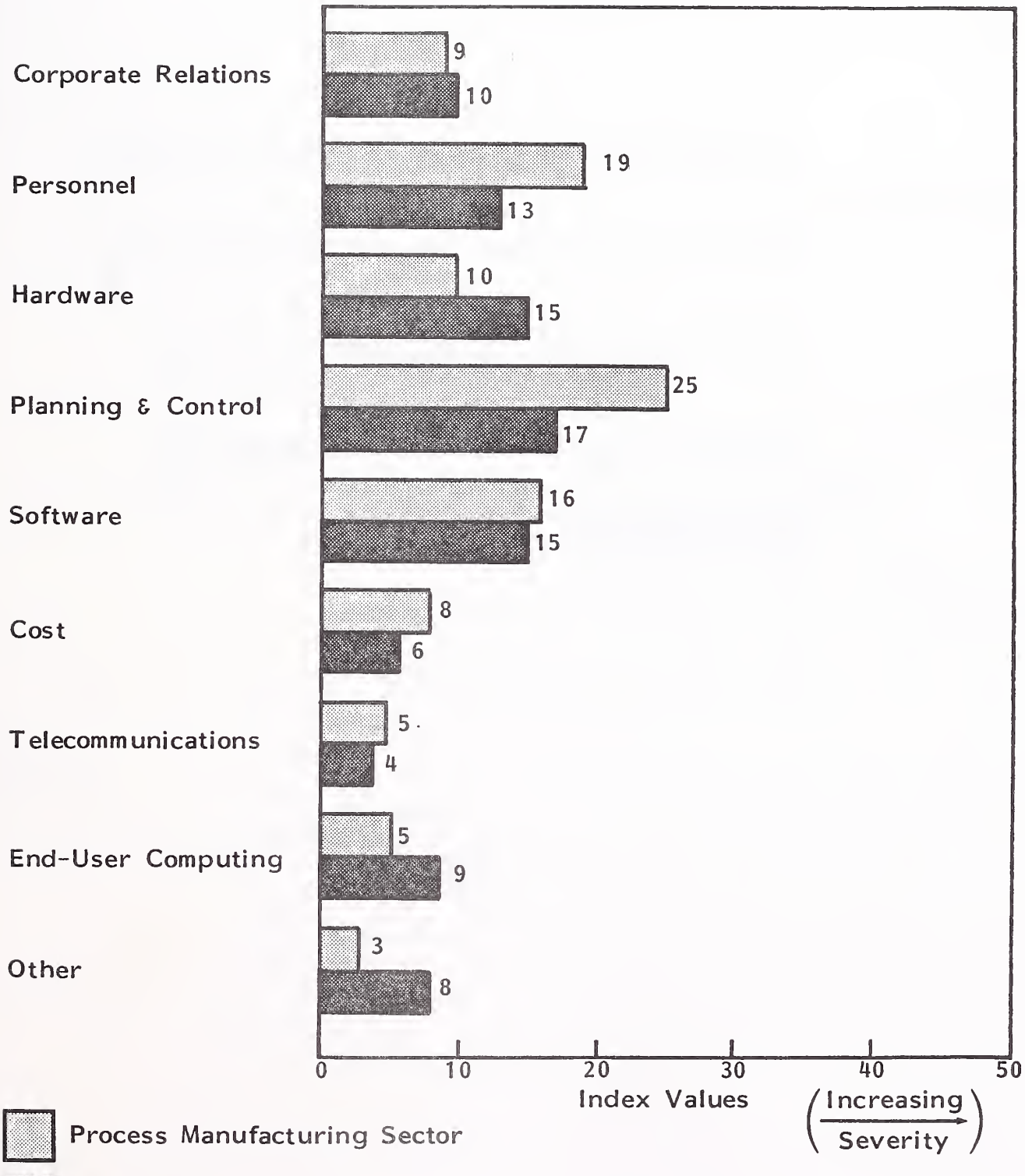
- Senior IS management in the process manufacturing sector--like their superiors--are most concerned with planning and control issues.
  - However, IS executives consider personnel issues to be second in importance, followed by software problems as third.
  - As shown by Exhibit V-12, end-user computing and telecommunications remained the least important problems in the process manufacturing sector.
- Last year, software led in importance, and planning and control issues came in third behind personnel issues. Finding qualified personnel is the main personnel issue concerning IS management in this industry sector.
- Planning and control and cost are two of the top five information systems problems. These are shown in Exhibit V-13.

c. Objectives

- Accomplishment of software objectives is extremely important to process manufacturers; the next most important objectives, those dealing with planning and control, are rated less than half as high, as shown in Exhibit V-14.
  - Accomplishment of applications development objectives is rated especially high.
  - Software upgrades and productivity subcategories also were important software objectives.

EXHIBIT V-12

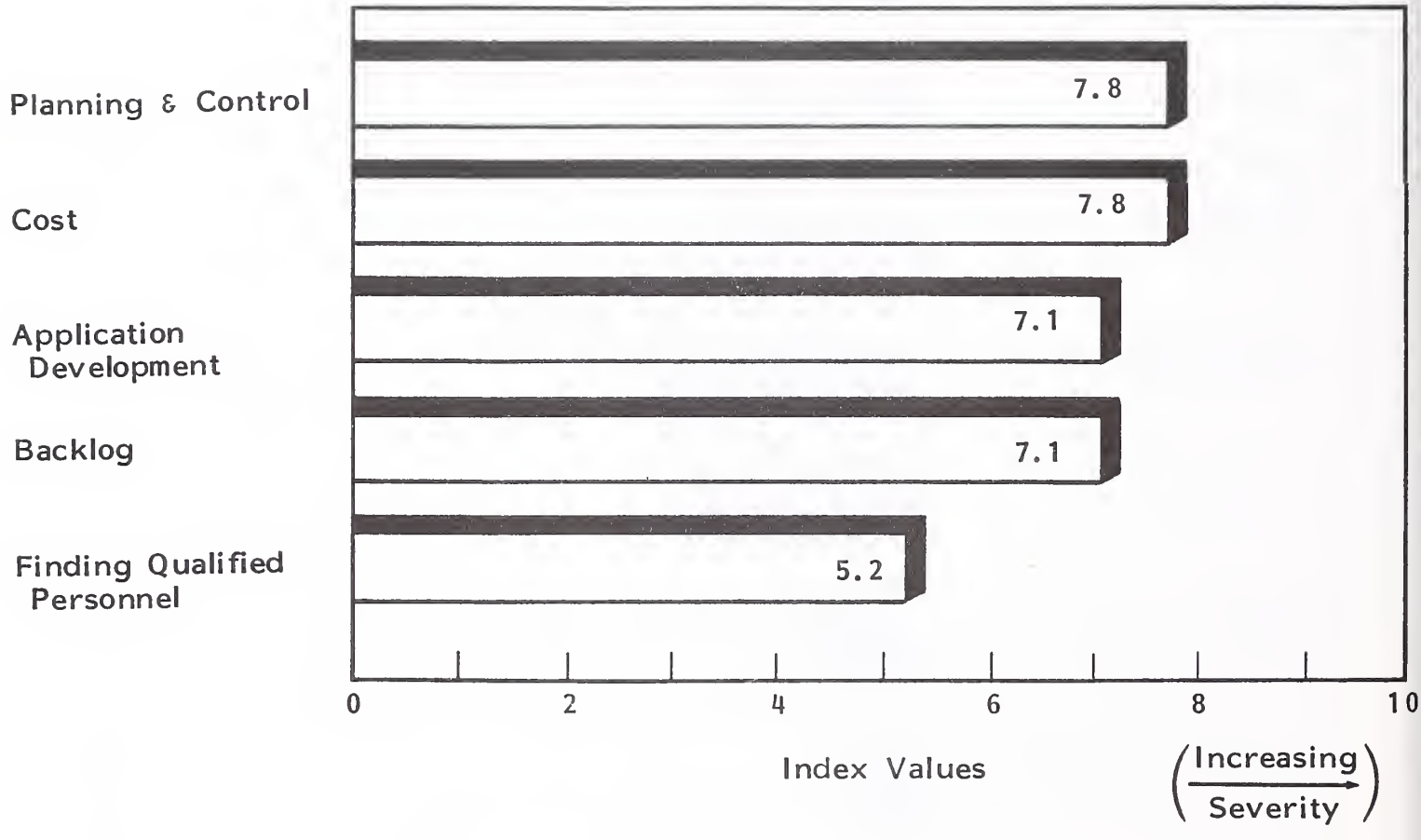
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE PROCESS MANUFACTURING SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-13

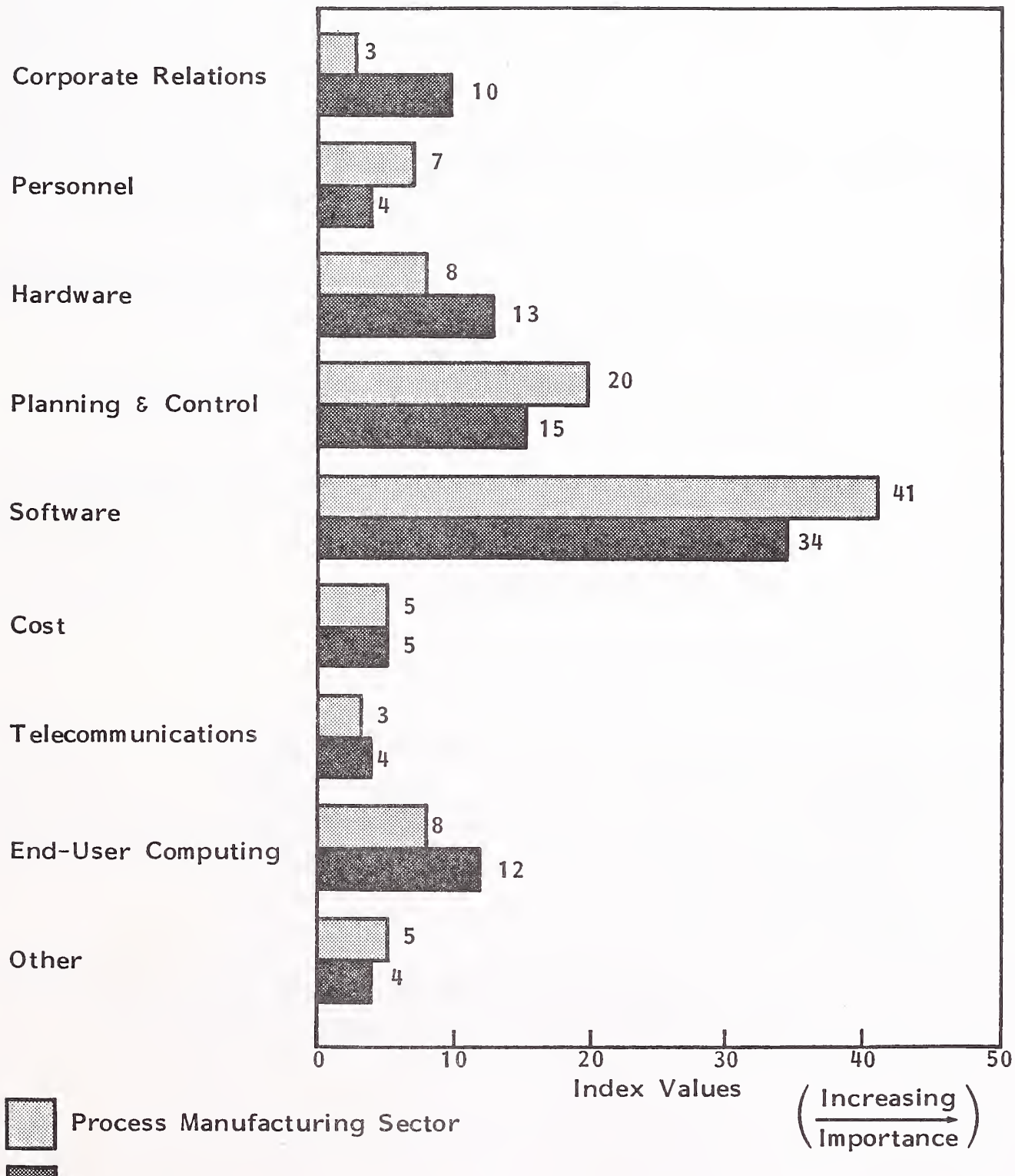
TOP FIVE INFORMATION SYSTEMS
PROBLEMS FOR THE PROCESS MANUFACTURING SECTOR
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-14

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE PROCESS MANUFACTURING SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Corporate relations objectives, in contrast with last year's research, shared the lowest ranking with telecommunications.

- Exhibit V-15 contains the top five objectives for this sector. These objectives cross the planning and control, software, cost, and personnel issues at the subgroup level of detail.

- Exhibit V-16 lists the issue groups in descending order of priority for objectives set by IS managers in process manufacturing. These are compared to IS problems, senior management concerns, and the significance of the issues as an area of change in the next three years. Process manufacturing IS managers do an average job of matching objectives to problems and areas of change. They do not assign the proper priority to cost issues, however.

- End-user computing rated "very high" as the most significant change affecting the information systems departments that responded.

  - Microcomputer acquisitions can account for most of this concern.

  - Respondent organizations that tended not to have central control over microcomputer acquisition also seemed the most concerned about planning and control as problems.

3. APPLICATIONS

- The top five internally supported IS applications planned by managers in the process manufacturing industry are shown in Exhibit V-17. Seventy-nine percent of the respondents said they will be developing cross-industry applications, while the remaining 21% said they will be developing industry-specific applications.

  - Many IS managers consider process control to be the most important industry-specific application supported by their departments.

EXHIBIT V-15

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE PROCESS MANUFACTURING INDUSTRY (IMPORTANCE TO I.S. MANAGERS)

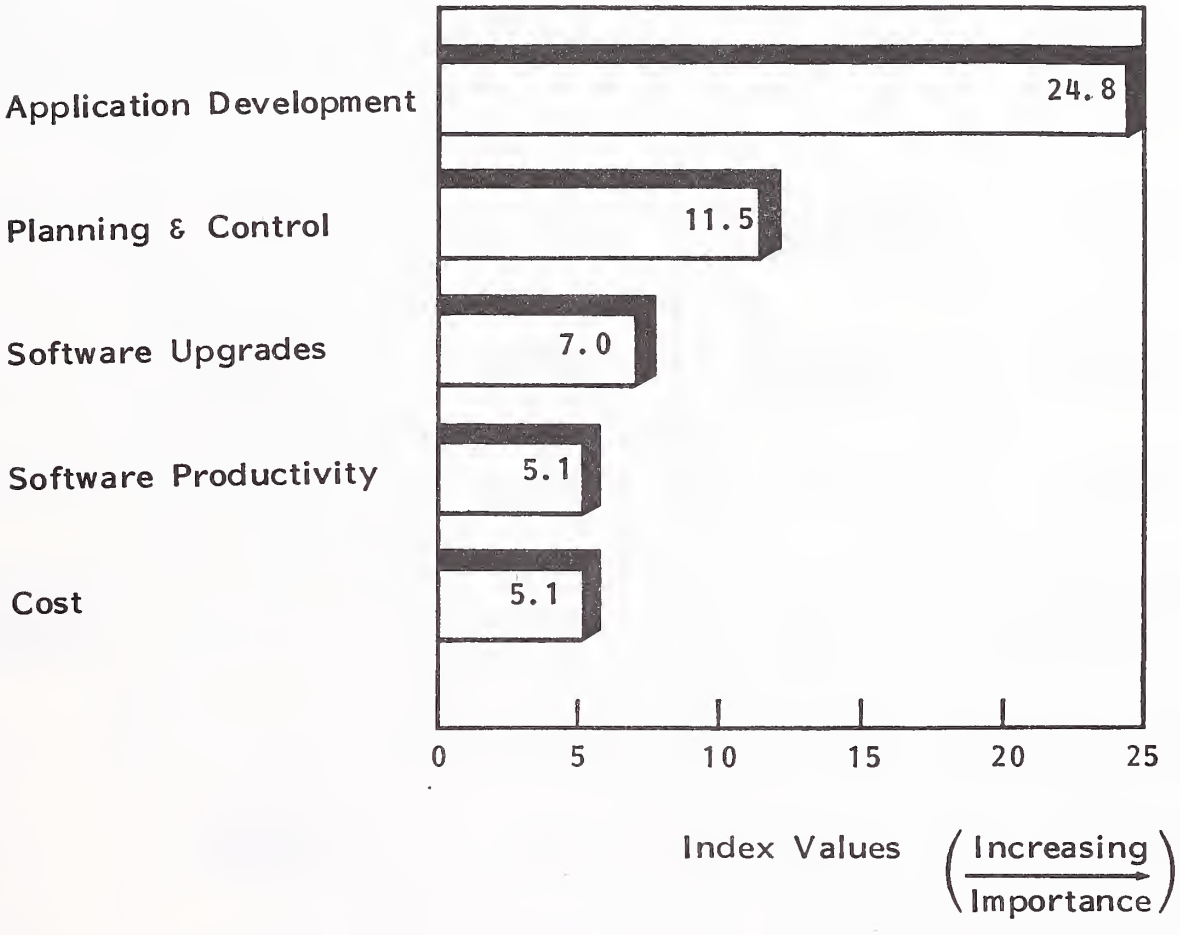


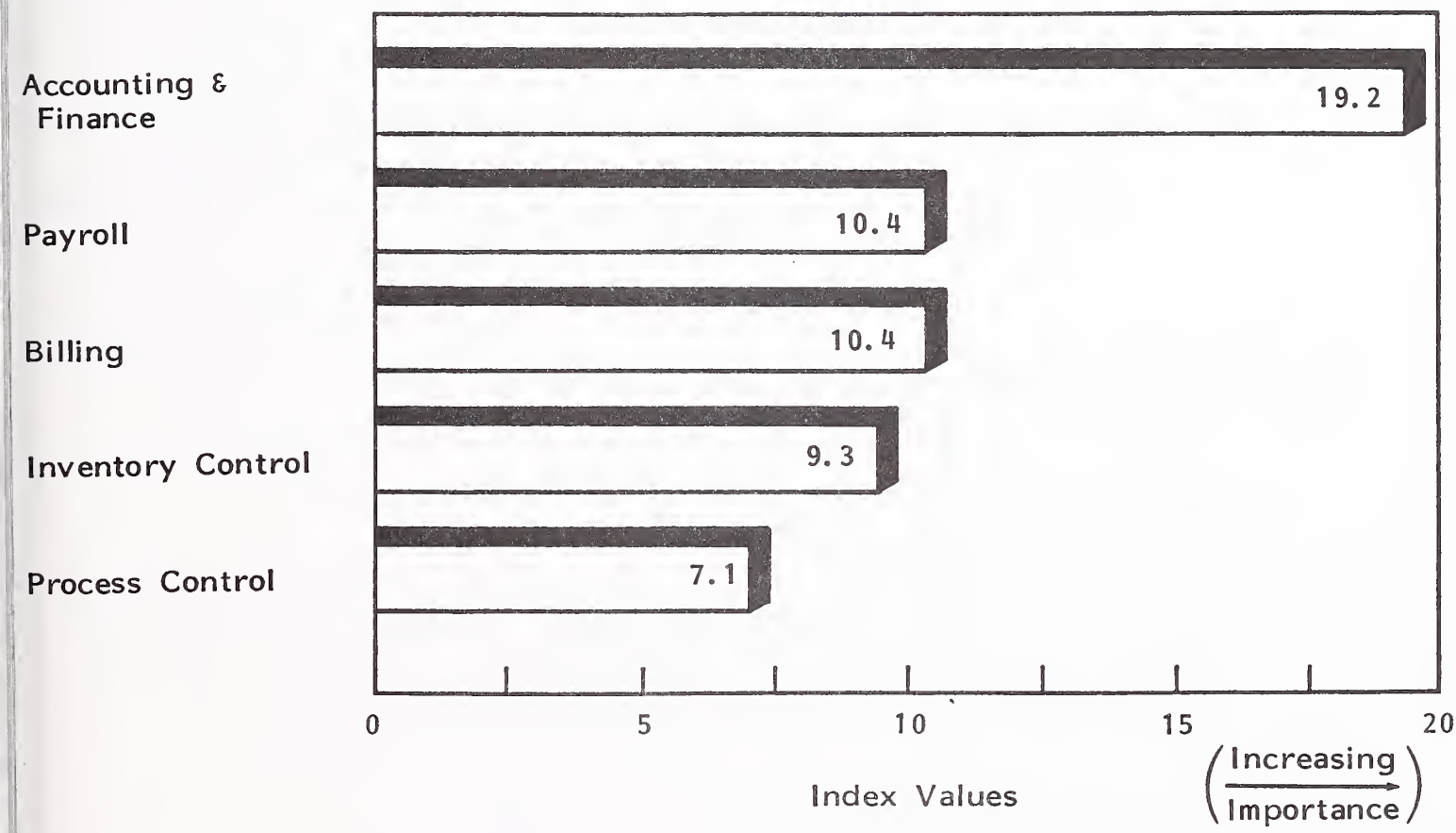
EXHIBIT V-16

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES
FOR THE PROCESS MANUFACTURING SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	Very High	Medium	Medium	Medium
Planning & Control	High	High	High	Low
Hardware	Low	Medium	Medium	Low
End-User Computing	Low	Low	Low	Very High
Personnel	Low	Medium	Low	Low
Cost	Low	Low	High	Low
Other	Low	Low	Low	Medium
Corporate Relationships	Low	Low	Medium	Low
Telecommunications	Low	Low	Low	Low

EXHIBIT V-17

RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE PROCESS MANUFACTURING INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- The process manufacturing IS managers encouraged cross-industry applications for internal development, emphasizing accounting and finance systems. Four of the top five internally developed applications are cross industry.

- Of the externally developed applications, payroll was the most important for the process manufacturing sector, according to Exhibit V-18.

  - Other cross-industry applications developed externally were accounting and finance and general ledger systems.

  - The most frequently mentioned industry-specific applications developed by outside companies for the process manufacturing industry were materials requirements planning (MRP) systems.

D. TRANSPORTATION SECTOR

1. BUDGET ANALYSIS

- Ninety-one percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Nine percent expect budgets to remain the same, and none expect decreases.

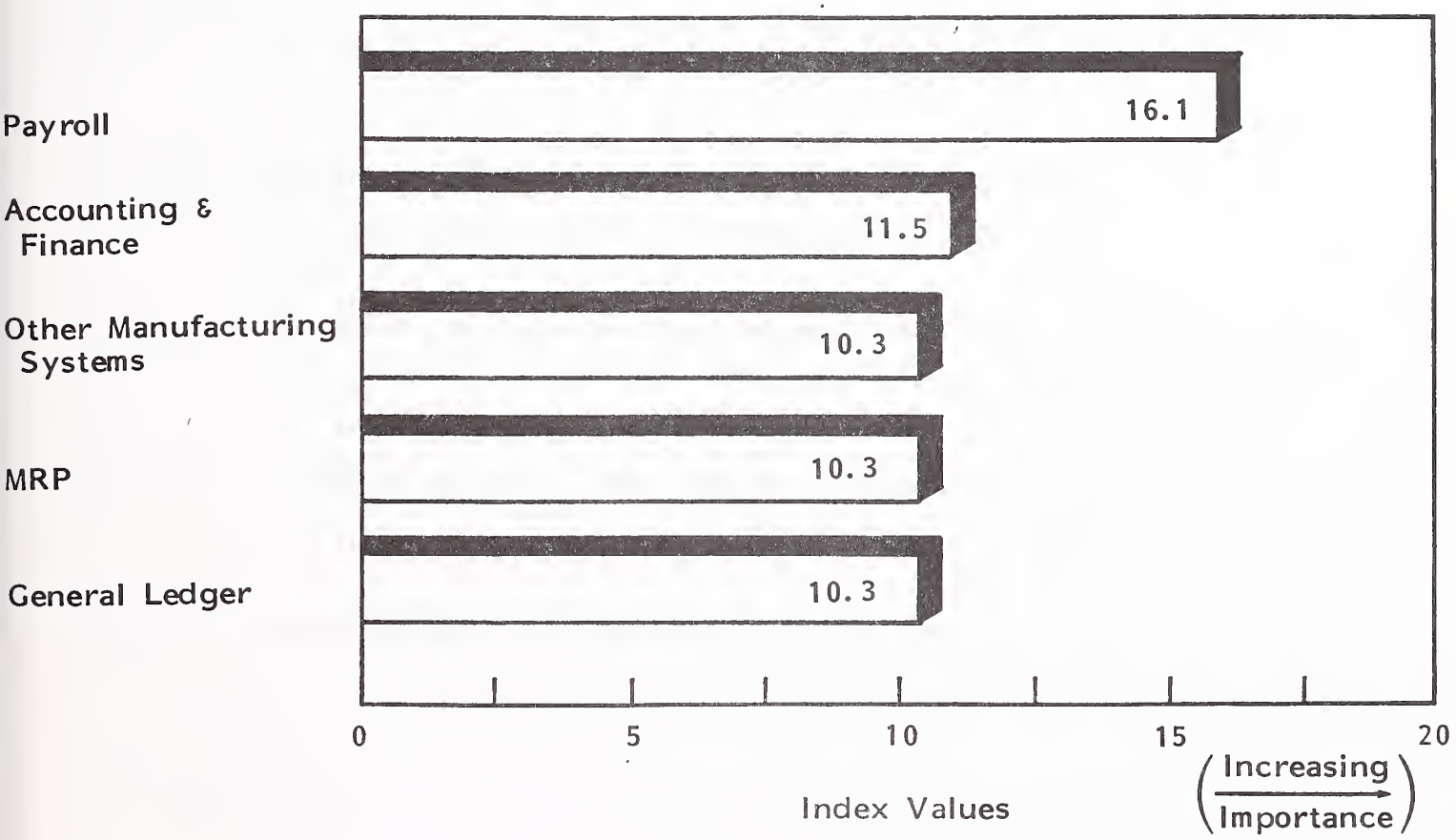
- The average budget growth expected in 1985 is 9%.

  - In 1984 budget growth was 10%.

  - The expected budget growth in 1985 for all industries is 11%.

EXHIBIT V-18

RELATIVE IMPORTANCE OF TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE PROCESS MANUFACTURING INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Exhibit V-19 shows the distribution of expenses in transportation information systems budgets.

- The transportation sector budget breakdown differs somewhat from the average of all industries.

  - Personnel expenses at 40% of the budget are similar to the average for all industries.

  - However, hardware expenses account for 21% and software for only 6% of information systems budgets in the transportation sector, compared with 29% and 9% respectively for all industries.

  - Sixteen percent of the respondents' budgets are used for communications, making communications the third greatest expense.

- The largest increase in expenditures expected in 1985 is in minicomputer purchases, which should go up 22%.

  - This is significantly greater than the industry composite, where the increase is still high at 17%.

  - Microcomputer and mass storage device expenses are also expected to increase significantly, at 11% and 18% respectively.

  - Custom programming is expected to increase at a modest 5%. This is in stark contrast to the 12% decline for all companies.

- Information systems budgets, as a percent of total transportation corporate revenue, are 1.8%. This is more than twice the average (0.8%) for all industries.

EXHIBIT V-19

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES
IN THE TRANSPORTATION SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	40.4%	7.2%
Mainframe Processors	6.3	2.9
Minicomputers	0.4	21.5
Microcomputers	0.7	10.9
Mass Storage Devices	5.6	17.5
Terminals	4.5	0.3
Peripherals	3.1	(0.1)
Total Hardware	20.6%	5.9%
Communications	15.7	7.7
External Software	1.4	7.0
Custom Programming	4.2	5.0
Integrated Systems	0.0	0.0
Total Software	5.6%	5.5%
Software Maintenance	0.5	0.0
Hardware Maintenance	12.2	5.4
Total Maintenance	12.7%	5.2%
Outside Processing Services	2.6	4.4
Other	2.4	7.5
Total	100.0%	9.4%

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Senior management concerns for the respondents in the transportation sector are shown in Exhibit V-20.

  - Corporate relations concern senior management the most.

  - Cost and planning and control follow closely as the second and third major concerns to senior management.

b. Problems

- Senior IS managers in the transportation sector see planning and control as their number one problem, as shown in Exhibit V-21.

- "Other" problems secondarily concern IS executives. The most frequently mentioned problem in this category was the AT&T breakup. This is understandable because communication costs make up 16% of IS budgets.

- Hardware-, software-, and end-user-computing-related problems were also cited as fairly severe problems.

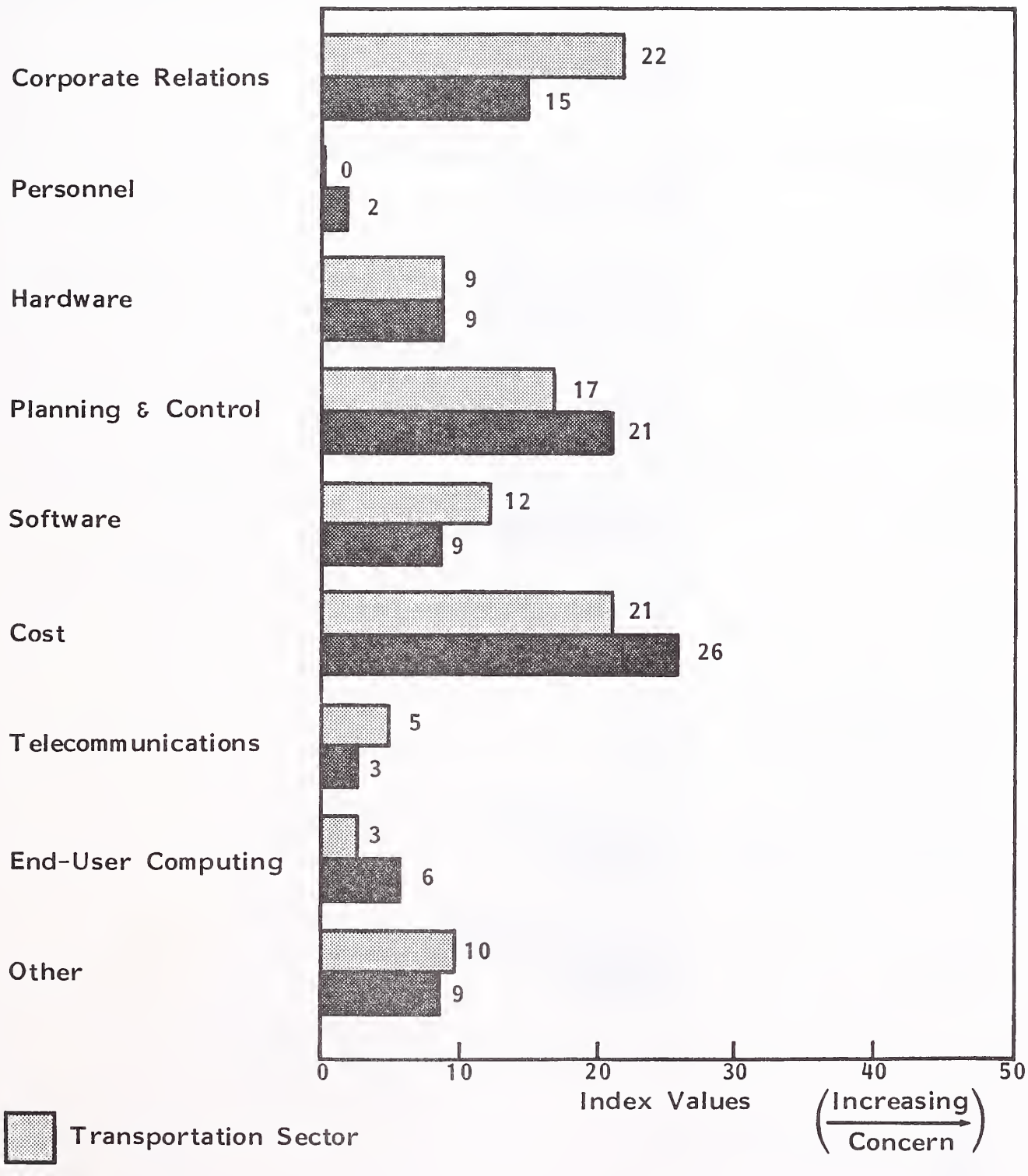
- Exhibit V-22 shows the planning issue subgroups that were rated as top problems in this sector.

c. Objectives

- The accomplishment of end-user computing and software objectives is extremely important to transportation sector respondents, as shown in Exhibit V-23.

EXHIBIT V-20

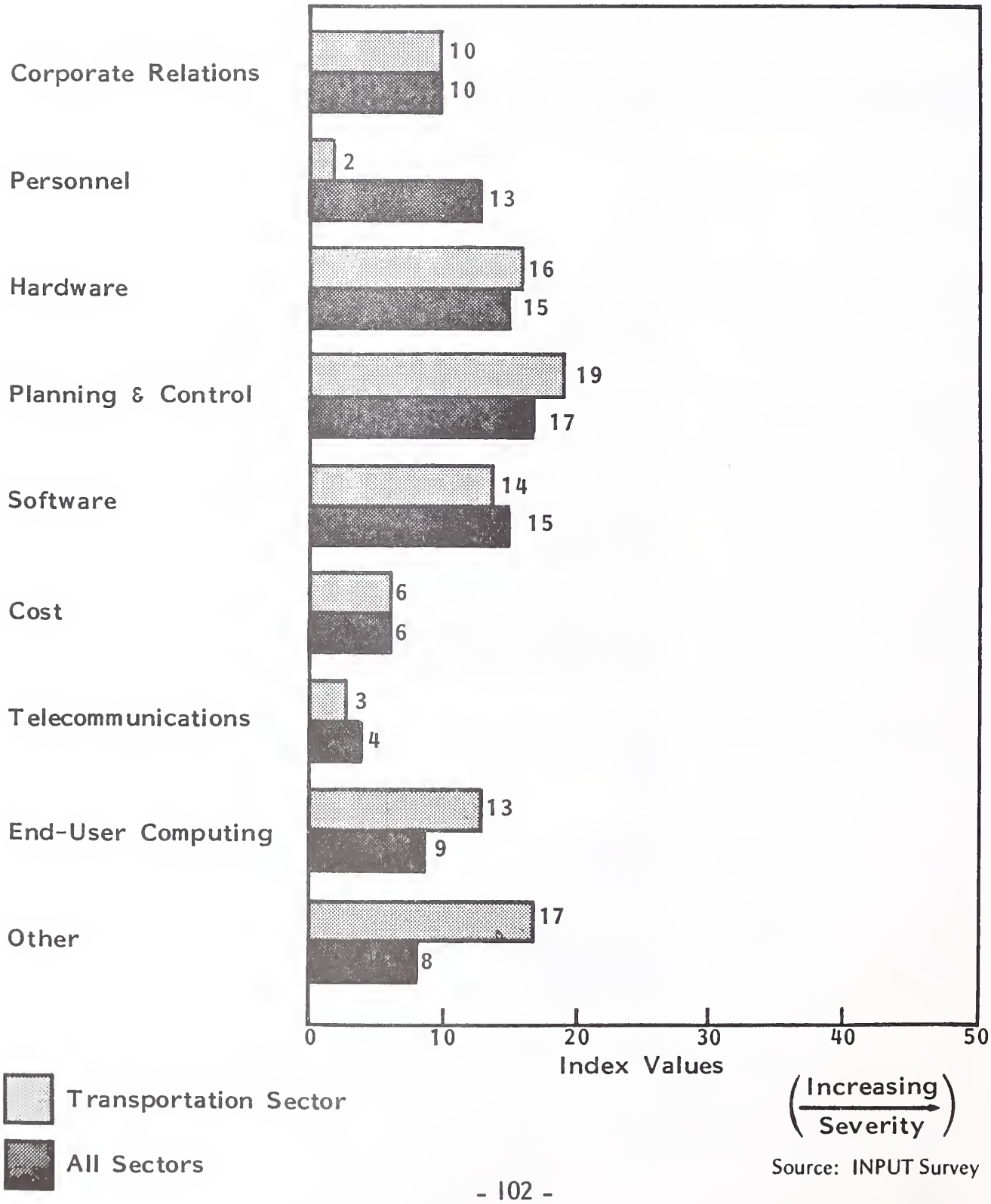
RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE TRANSPORTATION SECTOR



Source: INPUT Survey

EXHIBIT V-21

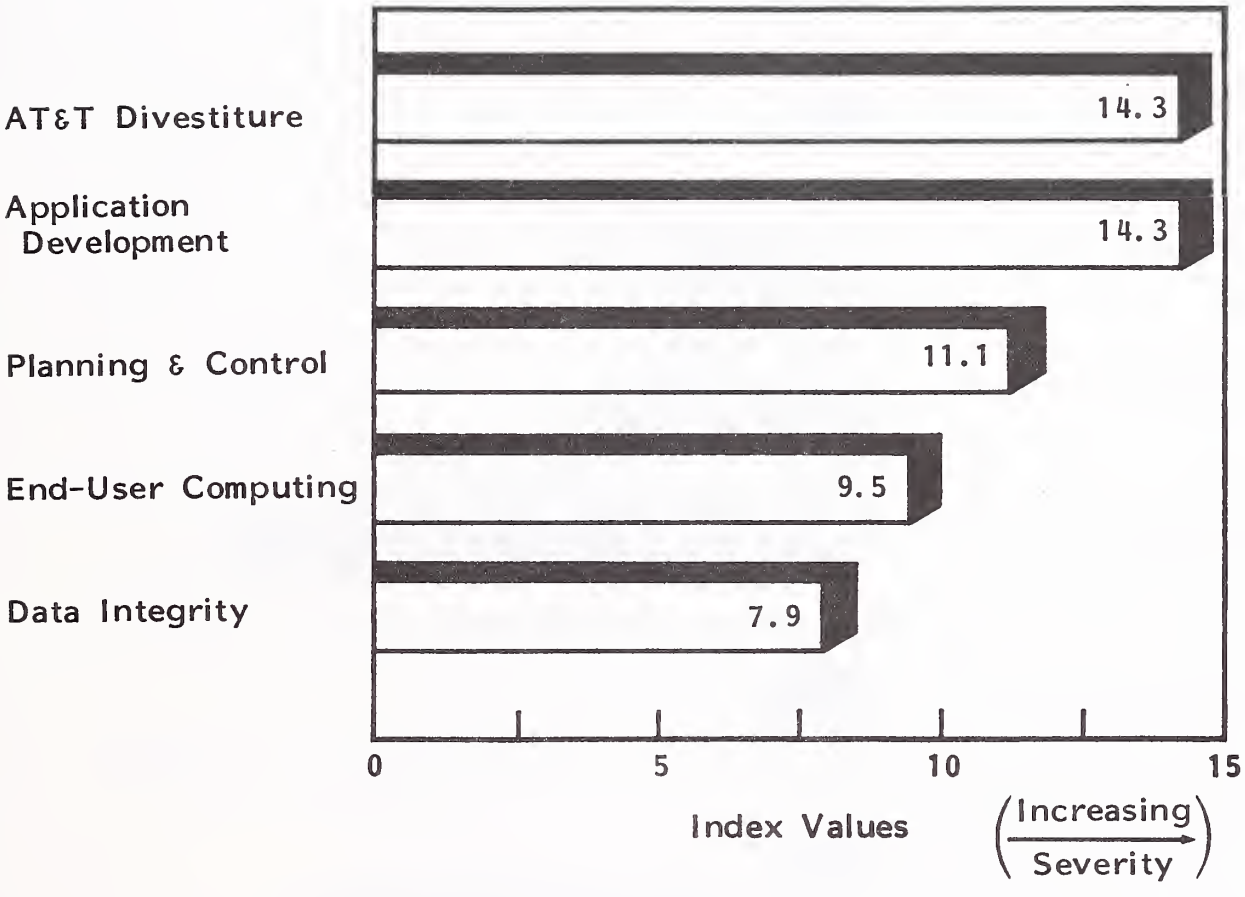
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE TRANSPORTATION SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-22

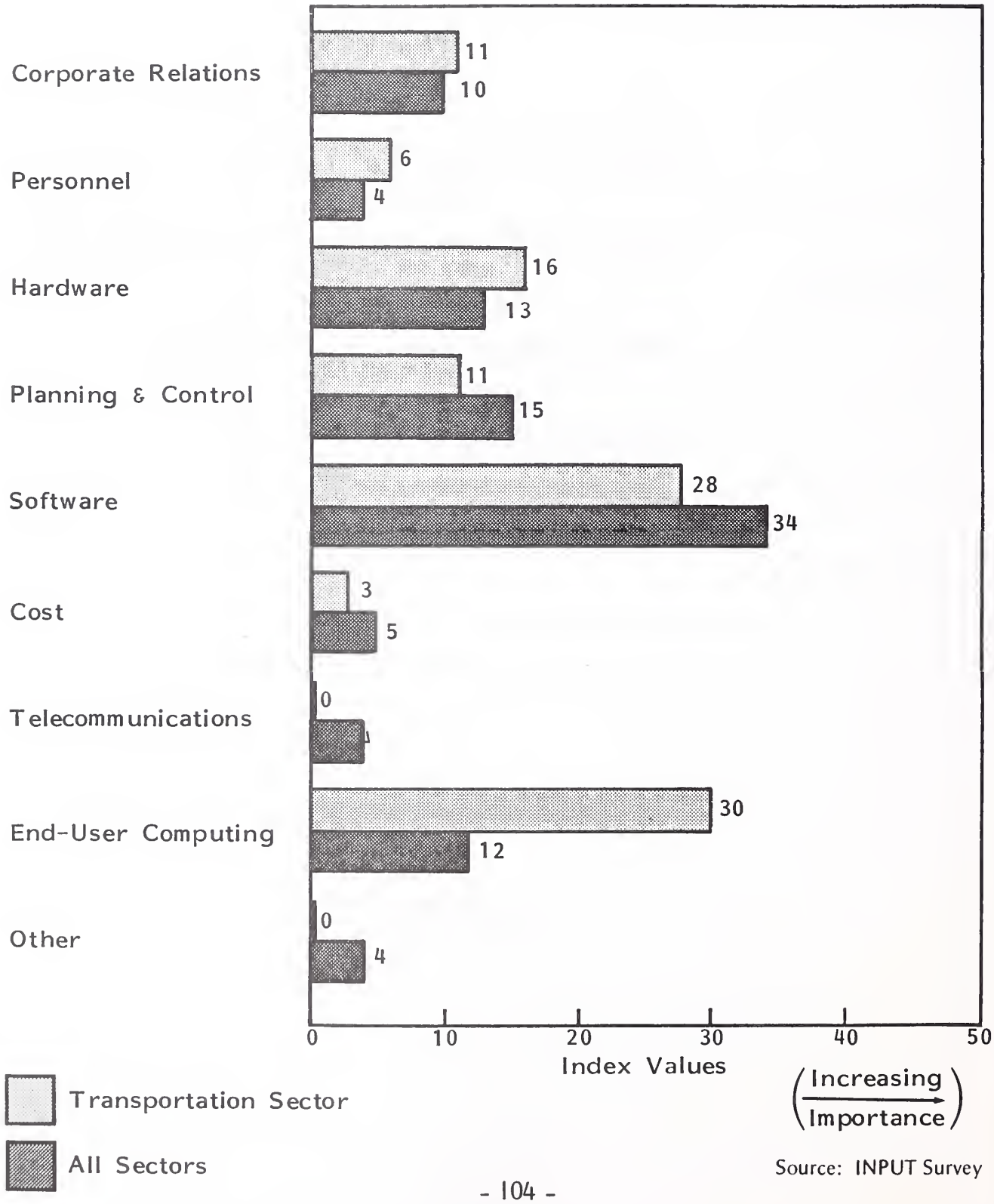
TOP FIVE INFORMATION SYSTEMS
PROBLEMS FOR THE TRANSPORTATION SECTOR
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-23

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE TRANSPORTATION SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Accomplishment of software applications, development objectives, and upgrades are rated especially high.

- Within the end-user computing category, managers express the greatest interest in general end-user computing, and several will focus specifically on office systems.

- Exhibit V-24 contains the top objectives for this sector at the subgroup level of detail.

- Exhibit V-25 lists the issue groups in descending order of priority for objectives set by IS managers in this sector. These are compared to the importance of IS problems, senior management concerns, and the significance of the issue groups as an area of change in the next three years. Information systems managers regard cost of low importance while senior management considers it of high importance.

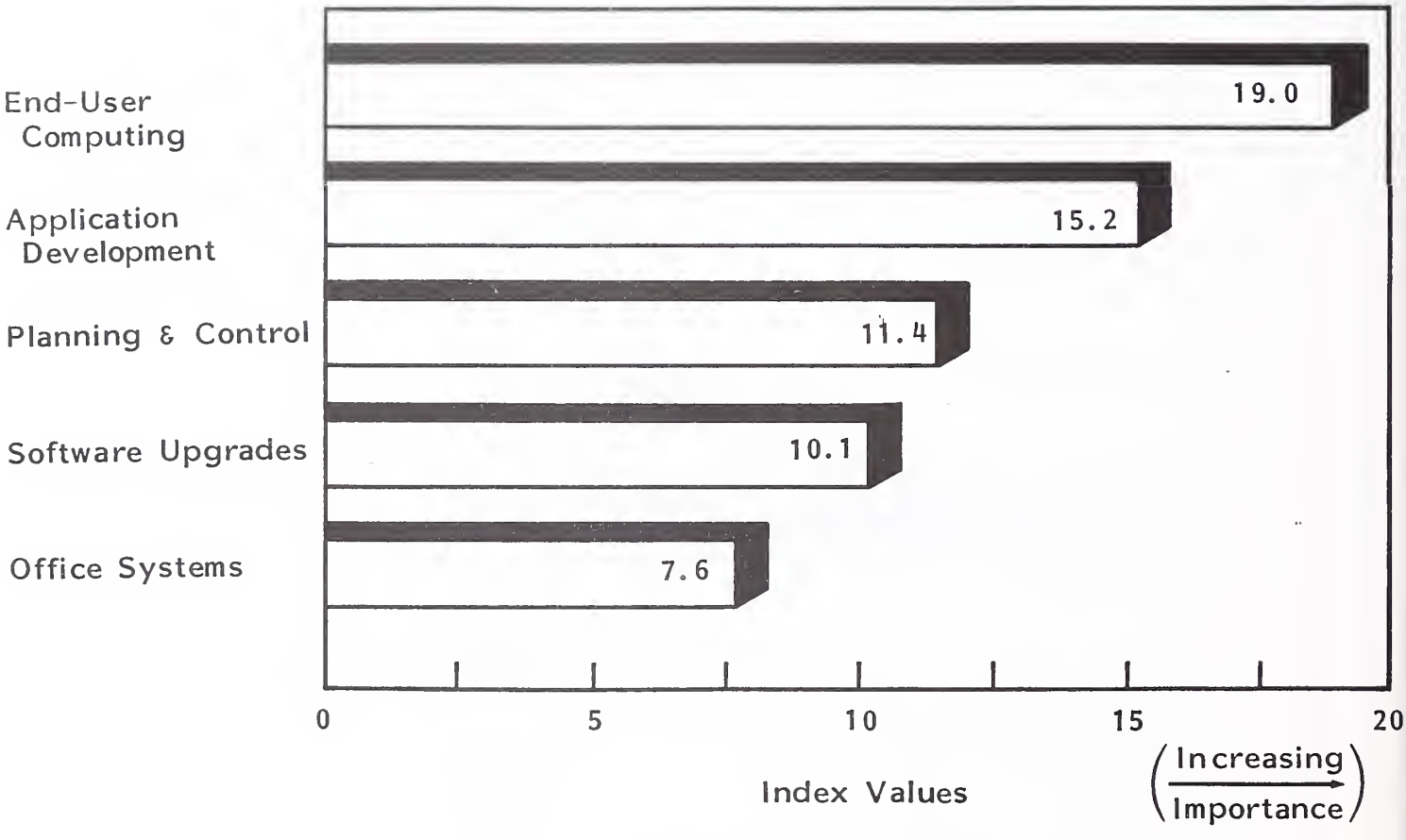
3. APPLICATIONS

- Forty-seven percent of internally developed applications and 34% of externally developed applications are industry specific. This closely resembles the average of 43% and 34% respectively for all industries.

- Exhibits V-26 and V-27 show the top five internally supported and externally developed applications.

EXHIBIT V-24

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE TRANSPORTATION INDUSTRY
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

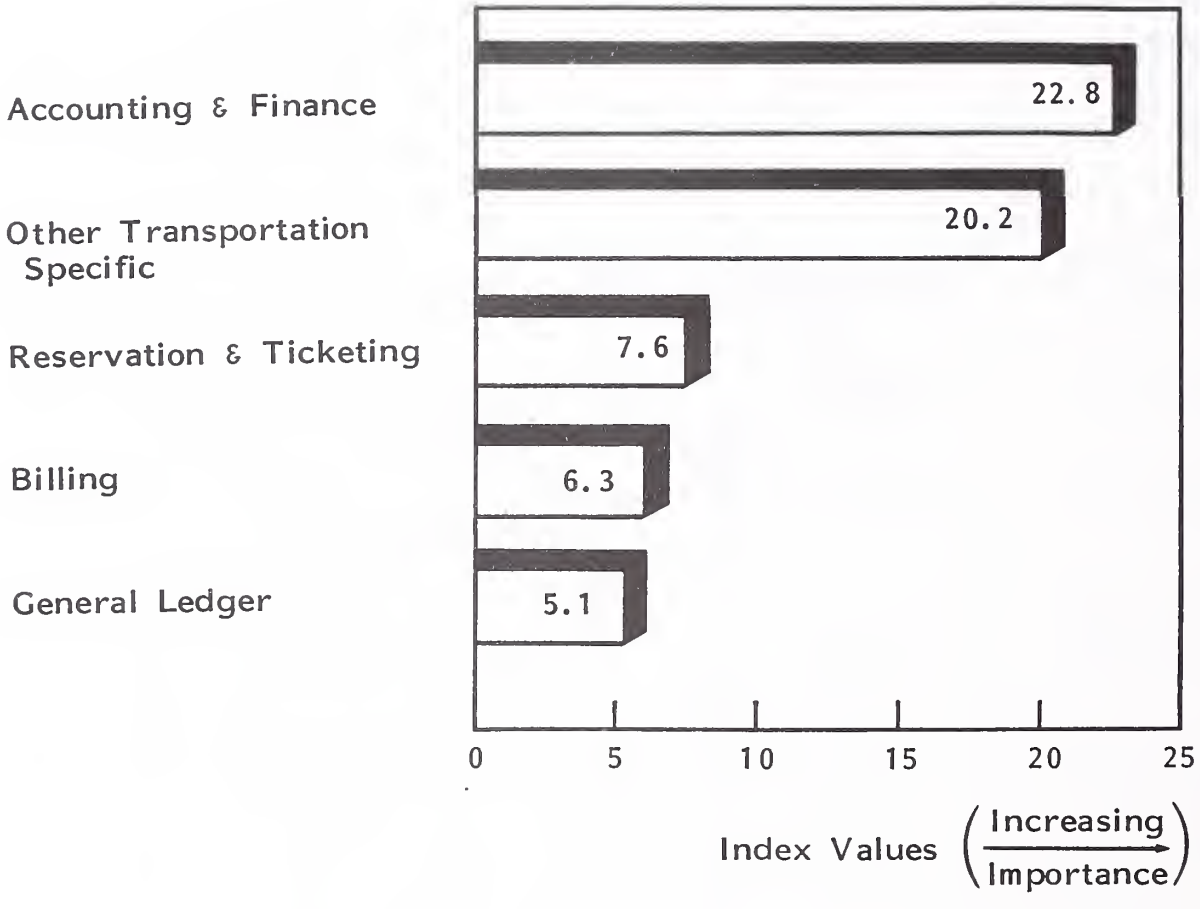
EXHIBIT V-25

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES FOR THE TRANSPORTATION SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
End-User Computing	Very High	Medium	Low	Very High
Software	High	Medium	Medium	Low
Hardware	Medium	Medium	Low	Medium
Corporate Relations	Medium	Medium	High	Medium
Planning & Control	Medium	Medium	Medium	Low
Personnel	Low	Low	Low	Low
Cost	Low	Low	High	Low
Telecommunications	Low	Low	Low	Low
Other	Low	Medium	Medium	Very High

EXHIBIT V-26

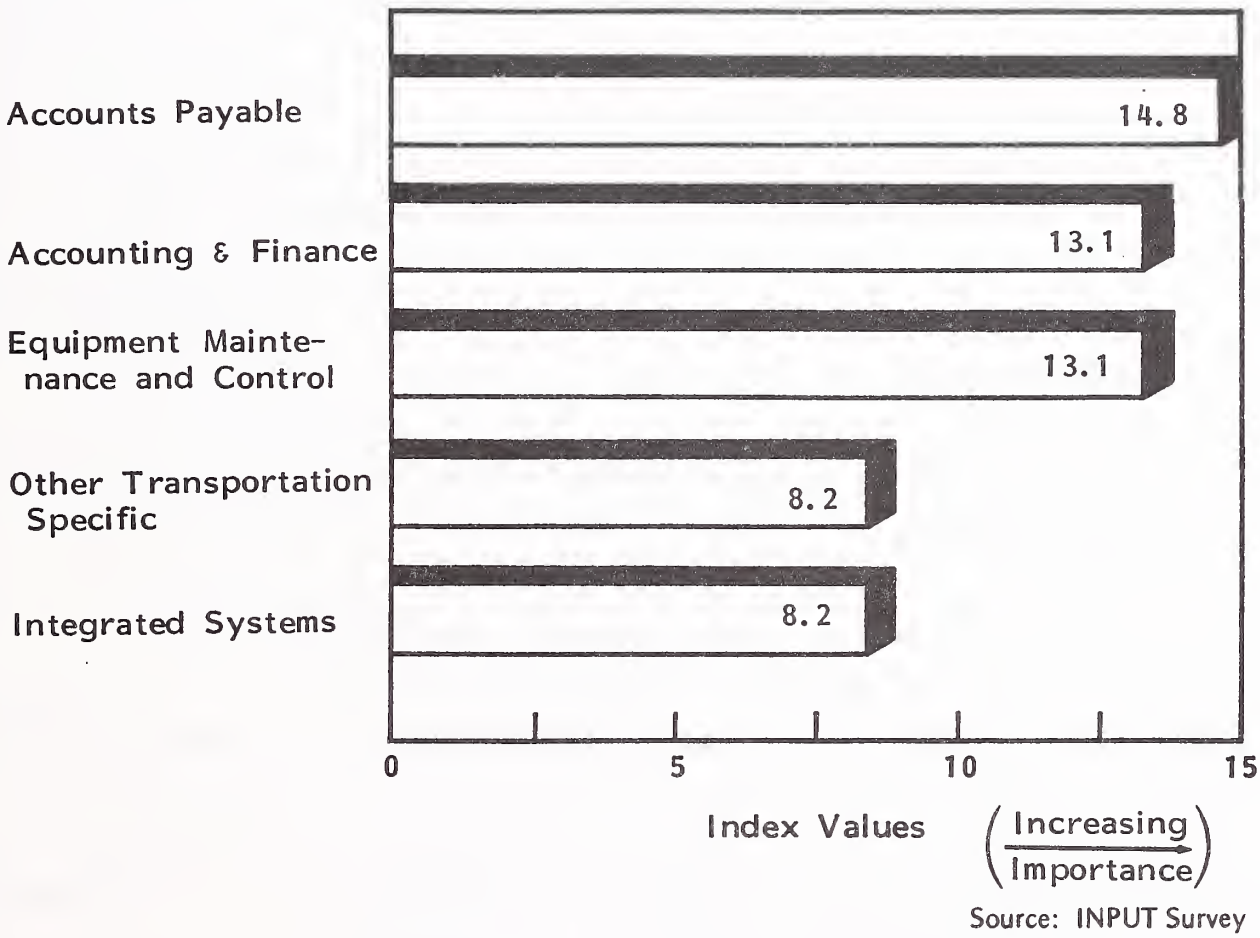
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE TRANSPORTATION INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-27

RELATIVE IMPORTANCE OF THE TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE TRANSPORTATION INDUSTRY
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

E. MEDICAL SECTOR

1. BUDGET ANALYSIS

- Eighty-two percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Nine percent expect budgets to remain the same, and 9% expect decreases.

- The average budget growth expected in 1985 is 4%.

  - In 1984 budget growth was 7%.

  - The expected budget growth in 1985 for all industries is 11%.

- Exhibit V-28 shows the distribution of expenses in medical sector information systems budgets.

- The medical sector budget breakdown closely parallels the average of all industries, except in software expenses.

  - At 38%, personnel expenses dominate the budget.

  - Hardware expenses are the next largest at 29%, followed by software at 13%.

- The largest increase in expenditures expected in 1985 is for minicomputers purchases, which should go up 22%.

  - This is also very similar to the industry composite, where the increase in minicomputers is 17%.

EXHIBIT V-28

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE MEDICAL SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	37.6%	7.5%
Mainframe Processors	8.4	3.5
Minicomputers	4.9	21.9
Microcomputers	2.4	10.9
Mass Storage Devices	3.3	11.2
Terminals	7.7	0.5
Peripherals	2.6	(1.7)
Total Hardware	29.3%	5.9%
Communications	7.9	7.7
External Software	9.6	7.0
Custom Programming	0.4	0.0
Integrated Systems	3.2	0.0
Total Software	13.2%	5.1%
Software Maintenance	1.0	5.5
Hardware Maintenance	6.0	5.2
Total Maintenance	7.0%	5.2%
Outside Processing Services	0.1	0.0
Other	4.9	7.9
Total	100.0%	3.6%

- Mass storage device and microcomputer expenses are also expected to increase significantly--about 11%.

- Information systems budgets as a percent of total medical corporate revenue is 1.8%. This is significantly above the 0.8% average for all industries.

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Senior management concerns about information systems issues closely parallel those of other industries, as shown in Exhibit V-29.

  - Cost is clearly the dominant issue for senior management.

  - Planning and control issues, as well as corporate relations, are also considered important.

b. Problems

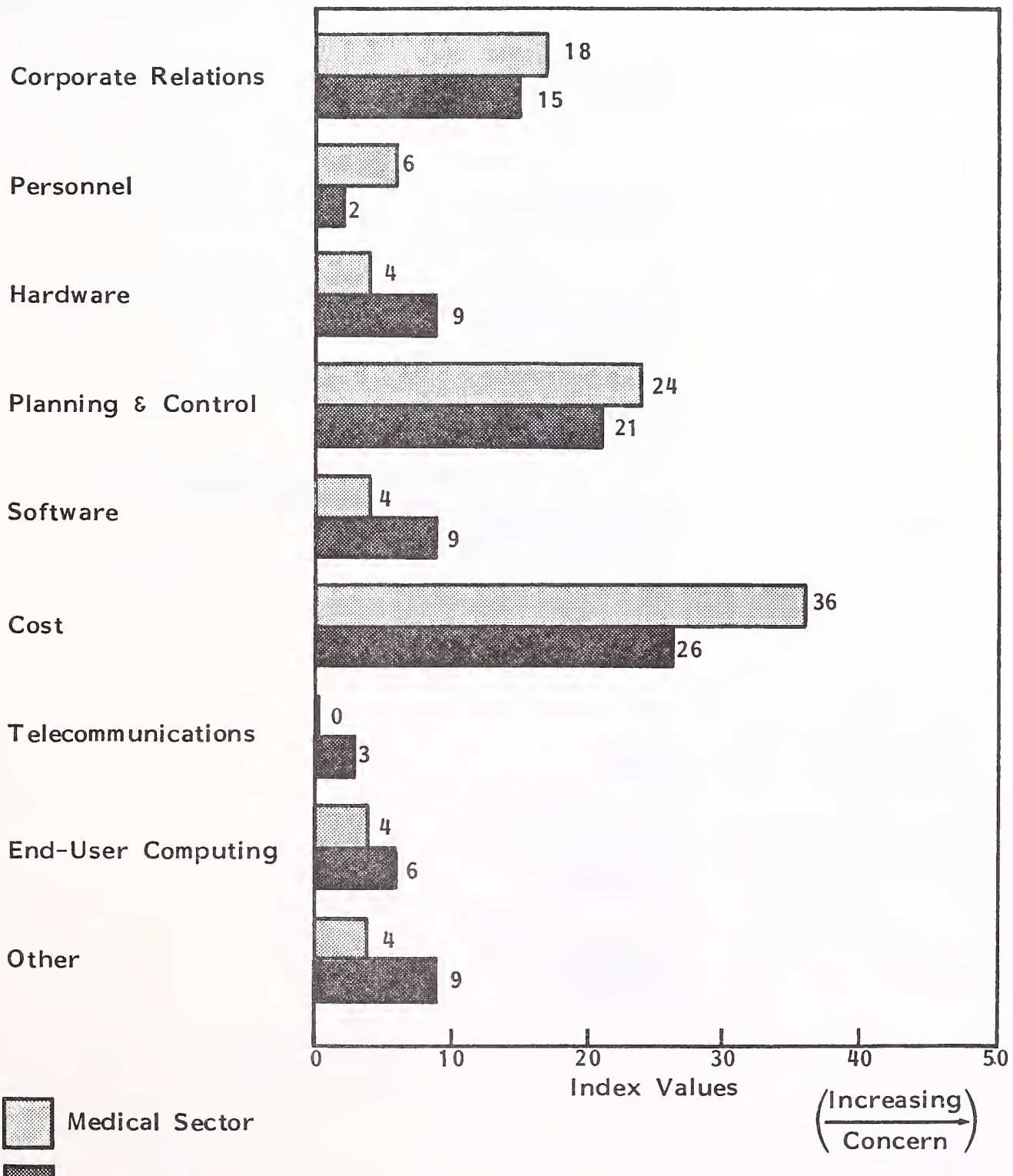
- Information systems managers in the medical sector see software as their number one problem, as shown in Exhibit V-30. They rate it high as a concern, as do many of the other human-resource-dependent sectors.

- Hardware and "other" (exogenous factors) are regarded as major problems by the medical sector respondents. The hardware problems in the medical sector stem from upgrades to existing systems.

- Exhibit V-31 shows the planning issue subgroups that were rated as top problems in this sector.

EXHIBIT V-29

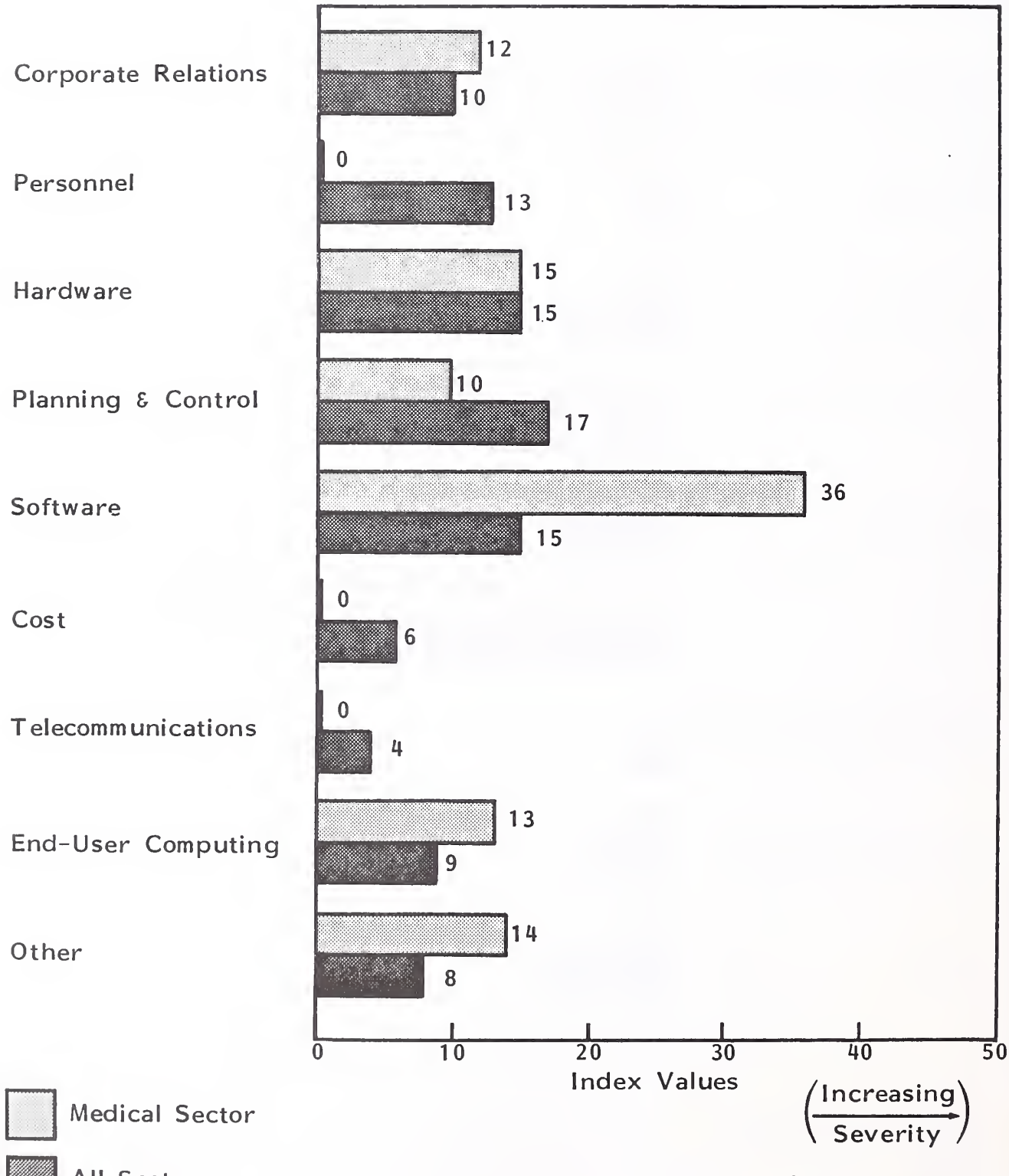
RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE MEDICAL SECTOR



Source: INPUT Survey

EXHIBIT V-30

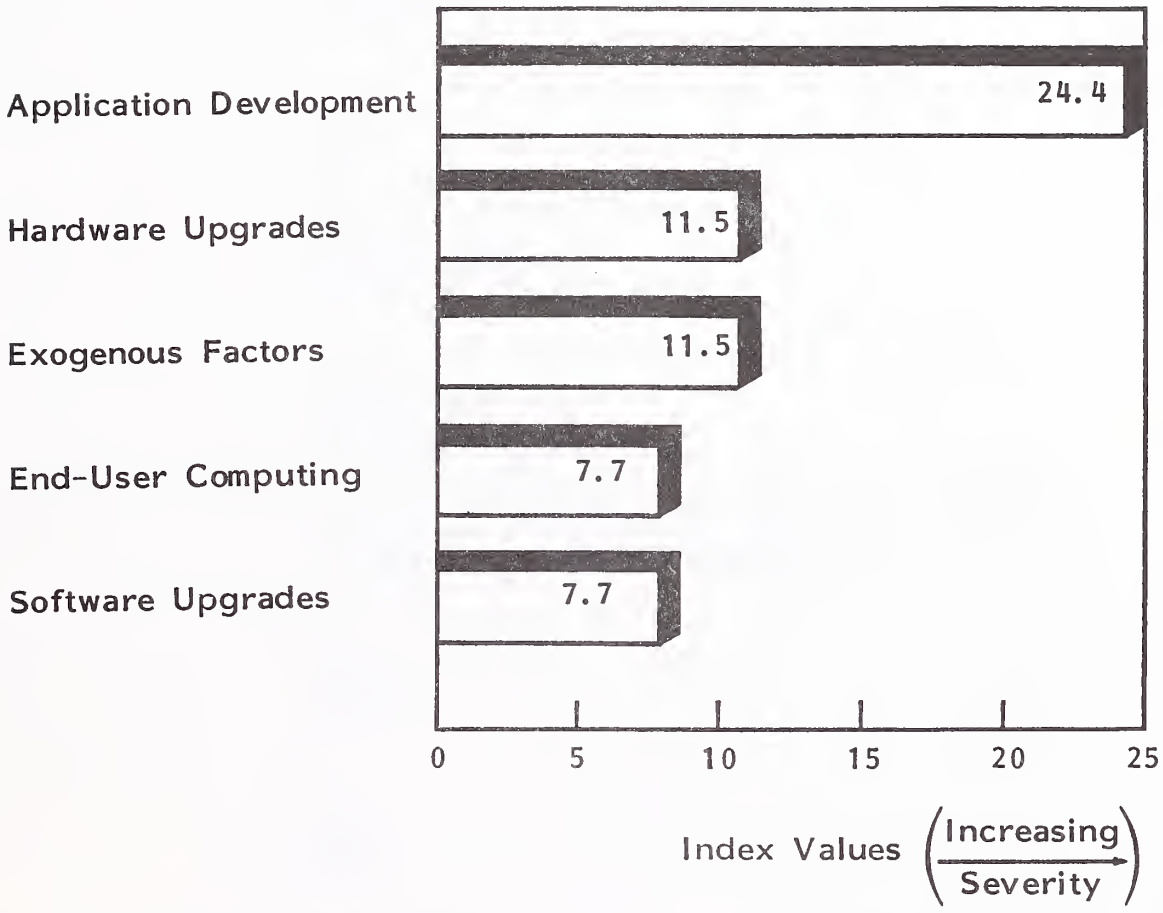
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE MEDICAL SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-31

TOP FIVE INFORMATION SYSTEMS PROBLEMS
FOR THE MEDICAL SECTOR
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

c. Objectives

- The accomplishment of software objectives is extremely important to the medical sector; the next most important objectives, those dealing with end-user computing, are rated less than half as high, as shown in Exhibit V-32.

  - Accomplishment of software applications objectives is rated especially high.

  - All aspects of end-user computing were significant objectives, including office systems, microcomputer acquisitions, information center management, and the micro-mainframe connection.

- Pesonnel and telecommunications objectives are rated lowest.

- Exhibit V-33 contains the top objectives for this sector. These objectives are at the issue subgroup level of detail.

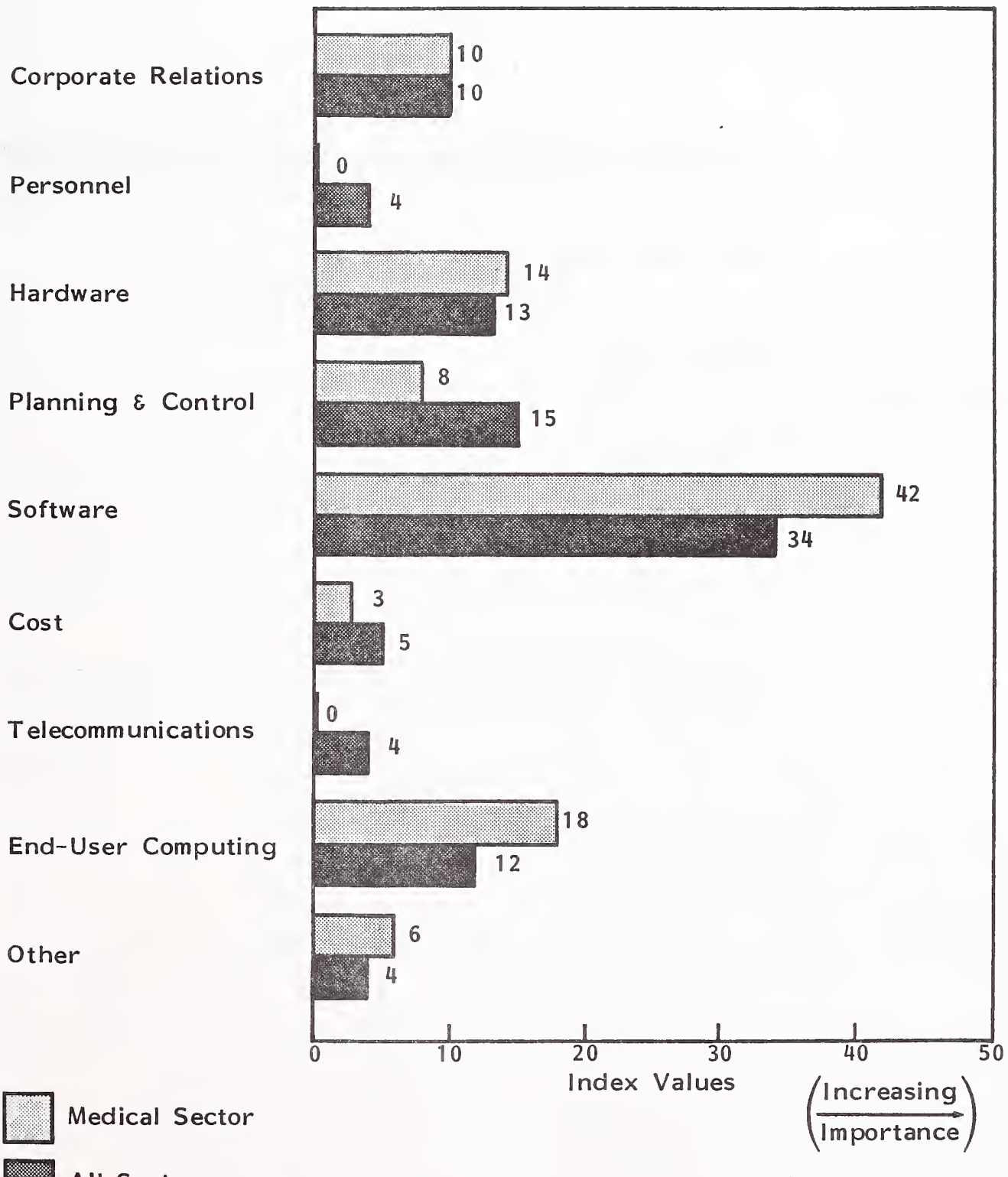
- Exhibit V-34 lists the issue groups in descending order of priority set by IS managers in the medical sector. These are compared to IS problems, senior management concerns, and the significance of the issues as an area of change in the next three years. By comparing the ratings shown for IS objectives to those of senior management concerns, it appears that IS management's emphasis is on end-user support via software, hardware, and end-user computing objectives; senior management, however, cares little about these issues, emphasizing control and cost as most important.

3. APPLICATIONS

- In this sector, 51% of internally developed applications and 45% of externally developed applications are industry specific.

EXHIBIT V-32

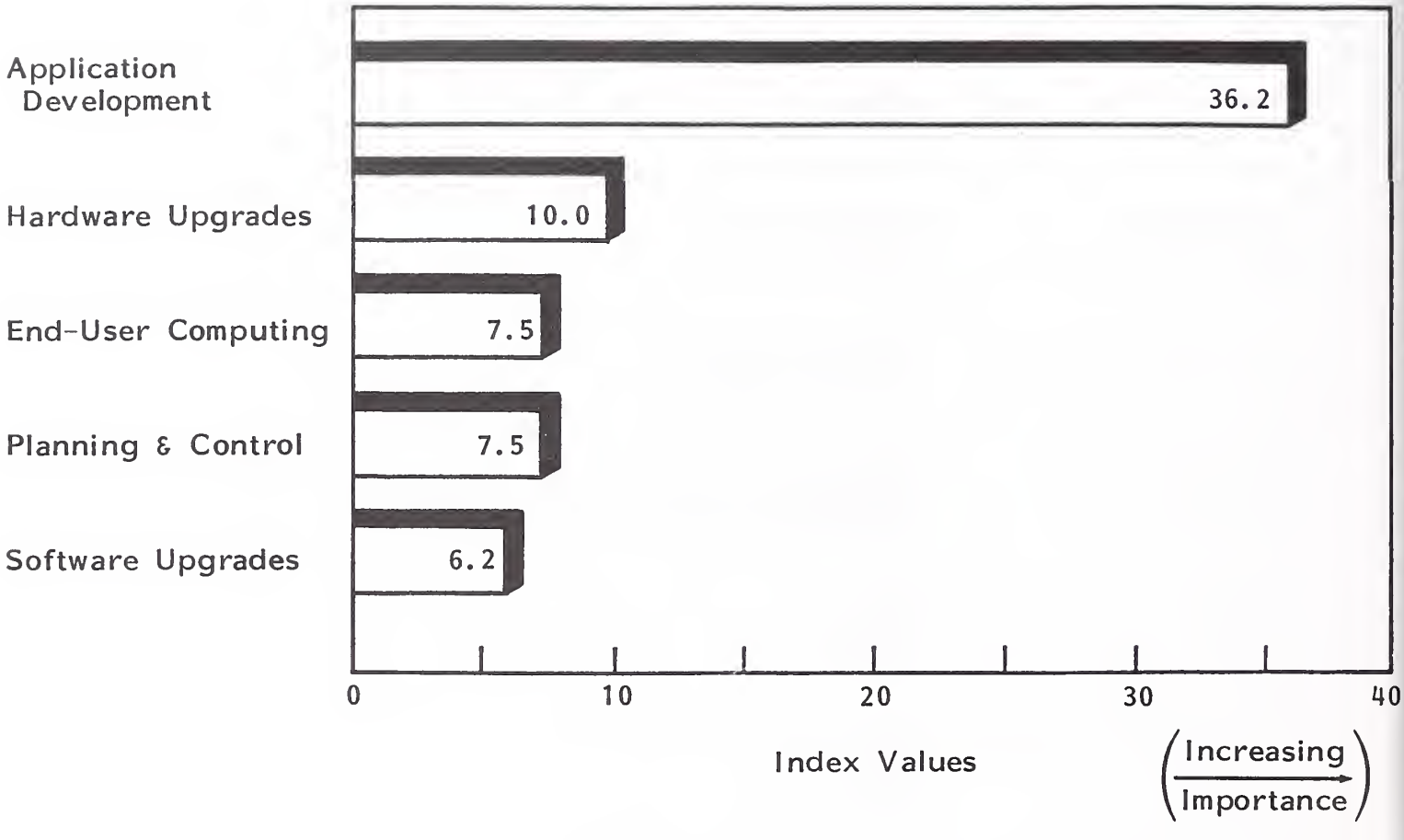
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE MEDICAL SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-33

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE MEDICAL INDUSTRY
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-34

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES FOR THE MEDICAL SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	Very High	Very High	Low	Very High
End-User Computing	Medium	Medium	Low	Very High
Hardware	Medium	Medium	Low	Low
Corporate Relations	Medium	Medium	Medium	Low
Planning & Control	Low	Medium	High	Low
Other	Low	Medium	Low	Low
Cost	Low	Low	Very High	Low
Personnel	Low	Low	Low	Low
Telecommunications	Low	Low	Low	Low

- Exhibits V-35 and V-36 show the top five internally supported and externally developed applications, respectively. Note the level of importance given to medical records management over accounting and finance applications.

F. SERVICES SECTOR

1. BUDGET ANALYSIS

- Ninety-one percent of the companies in this sector--compared with 87% from all industries-- expect information systems budgets to increase in 1985. Nine percent expect budgets to remain the same, and none expect decreases.

- The average budget growth expected in 1985 is 10%.

  - In 1984 budget growth was 11%.

  - The expected budget growth in 1985 for all industries is 11%.

- Exhibit V-37 shows the distribution of expenses in the services sector information systems budgets.

- The service sector budget breakdown closely prallels the average of all industries.

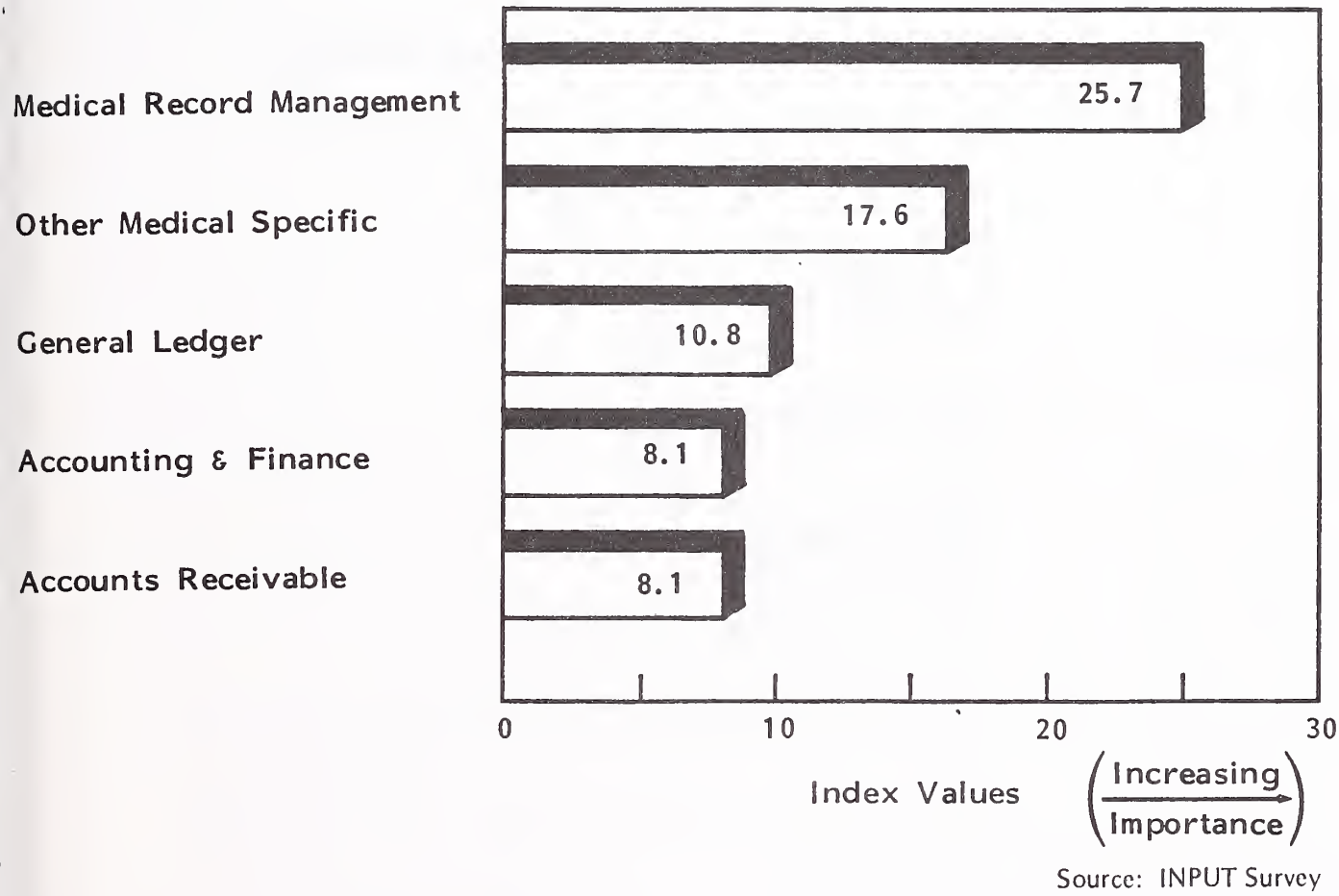
  - At 40%, personnel expenses dominate the budget.

  - Hardware expenses, at 26%, are the next largest, followed by communications at 10%.

- The largest increase in expenditures expected in 1985 is in minicomputers and outside processing services, which should increase by 21% and 20%, respectively.

EXHIBIT V-35

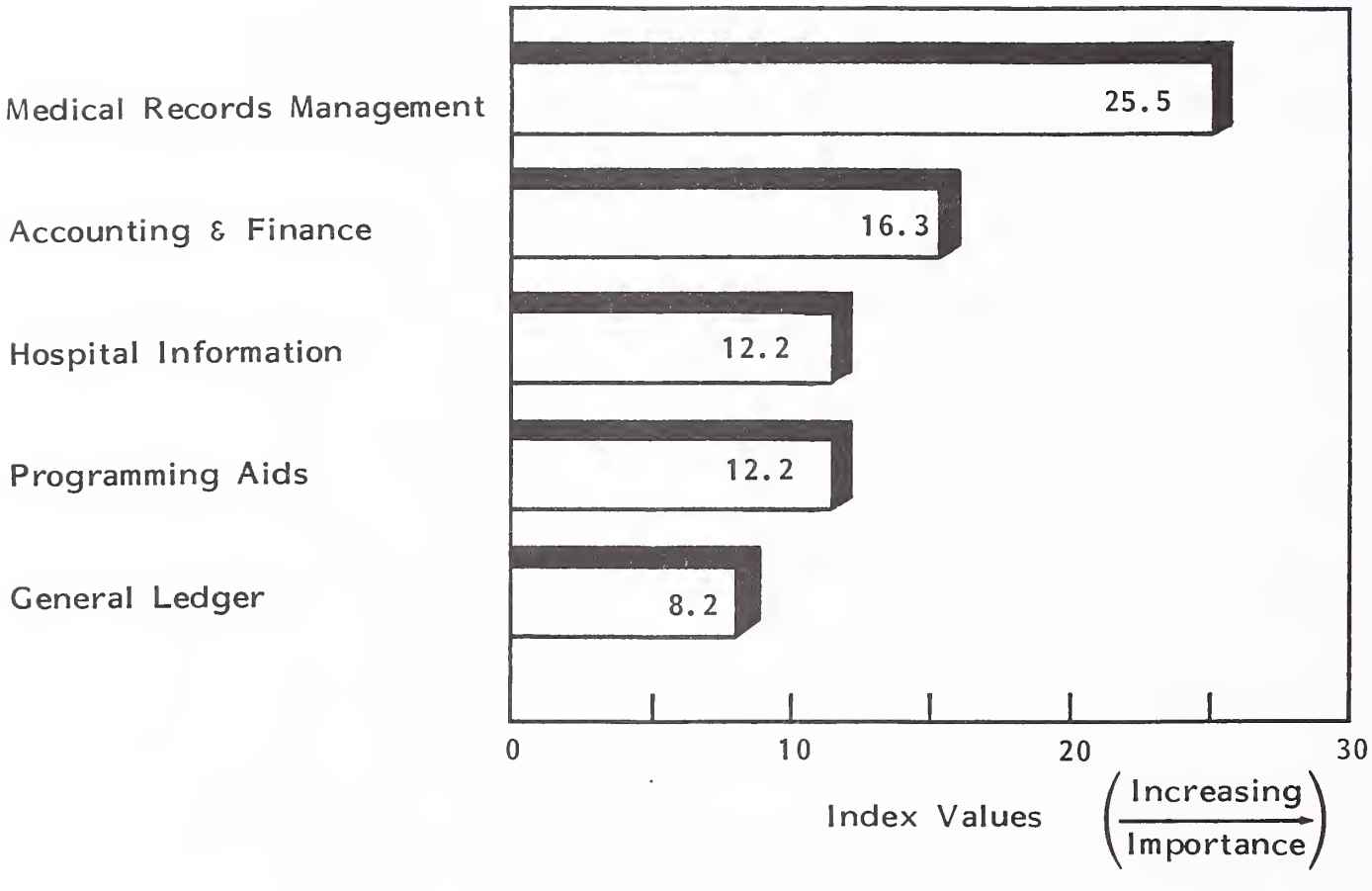
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE MEDICAL INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-36

RELATIVE IMPORTANCE OF TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE MEDICAL INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-37

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE SERVICES SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	39.8%	10.0%
Mainframe Processors	9.3	4.7
Minicomputers	3.2	21.2
Microcomputers	4.9	10.9
Mass Storage Devices	3.2	11.0
Terminals	2.3	0.7
Peripherals	3.3	0.1
Total Hardware	26.2%	5.9%
Communications	9.9	9.8
External Software	3.8	7.0
Custom Programming	0.3	0.0
Integrated Systems	0.6	0.0
Total Software	4.7%	5.7%
Software Maintenance	1.3	9.6
Hardware Maintenance	4.0	10.9
Total Maintenance	5.3%	10.6%
Outside Processing Services	4.6	20.0
Other	9.5	7.2
Total	100.0%	9.8%

- Outside processing is in marked contrast to the industry composite, where it is expected to increase by just over 1%.

- Microcomputers, mass storage devices, hardware maintenance, and personnel expenses are also expected to increase significantly (by at least 10% each).

- Information systems budgets as a percent of total services corporate revenue are 1.1%. This is above the 0.8% average for all industries.

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Senior management concerns about information systems issues parallel those of other industries, except for "other" issues, as shown in Exhibit V-38.

  - The major component of the "other" issue category was concern about the AT&T divestiture.

  - This is amplified due to the public data base service companies in the sample.

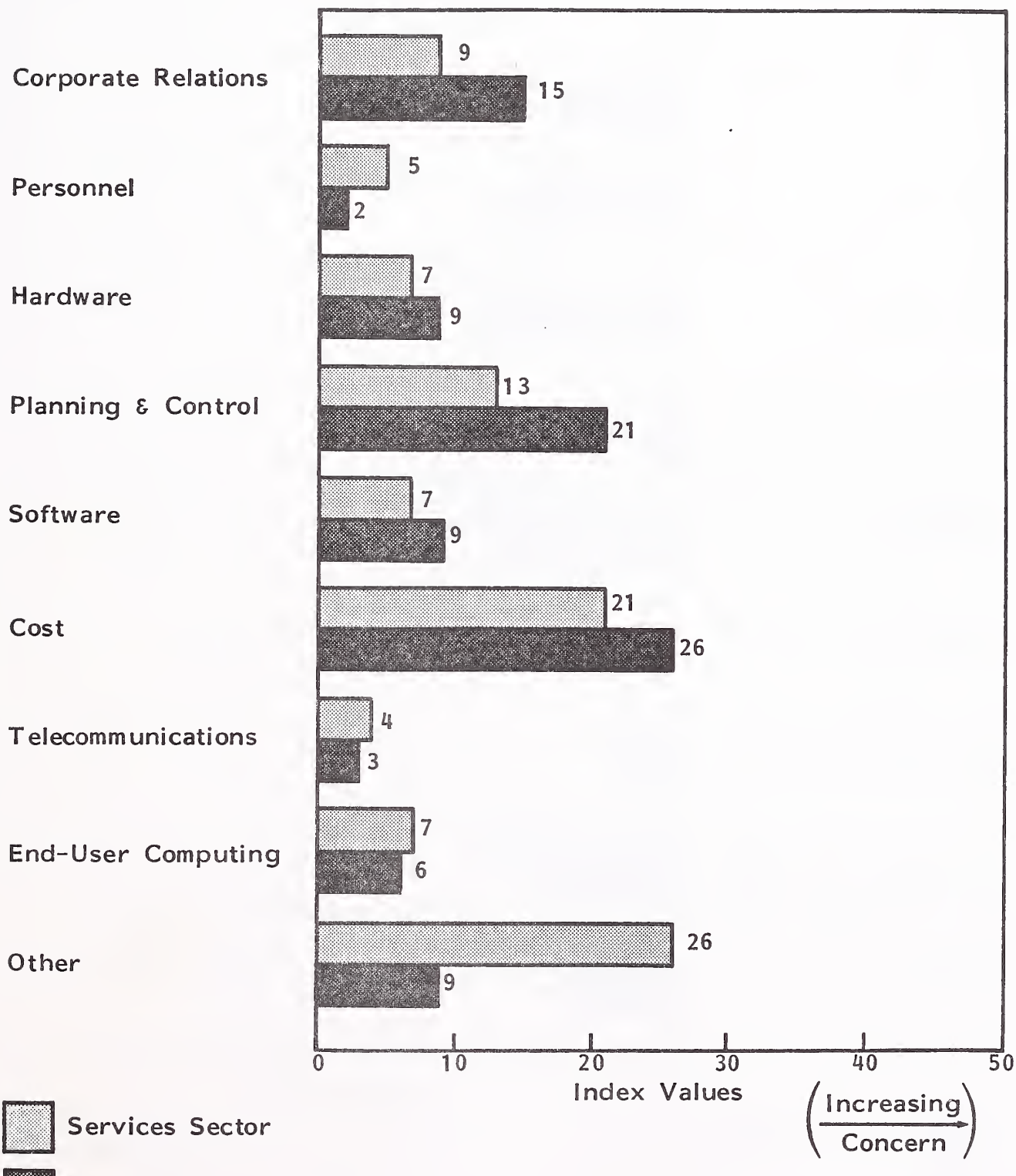
- Both cost and planning and control issues are also dominant to these executives, although planning and control was relatively less important than for other industries.

b. Problems

- Senior information systems management in the services sector see "other" issues (new technologies and exogenous factors) as their major problem, as shown in Exhibit V-39. This is rated higher as a concern than in any other industry sector.

EXHIBIT V-38

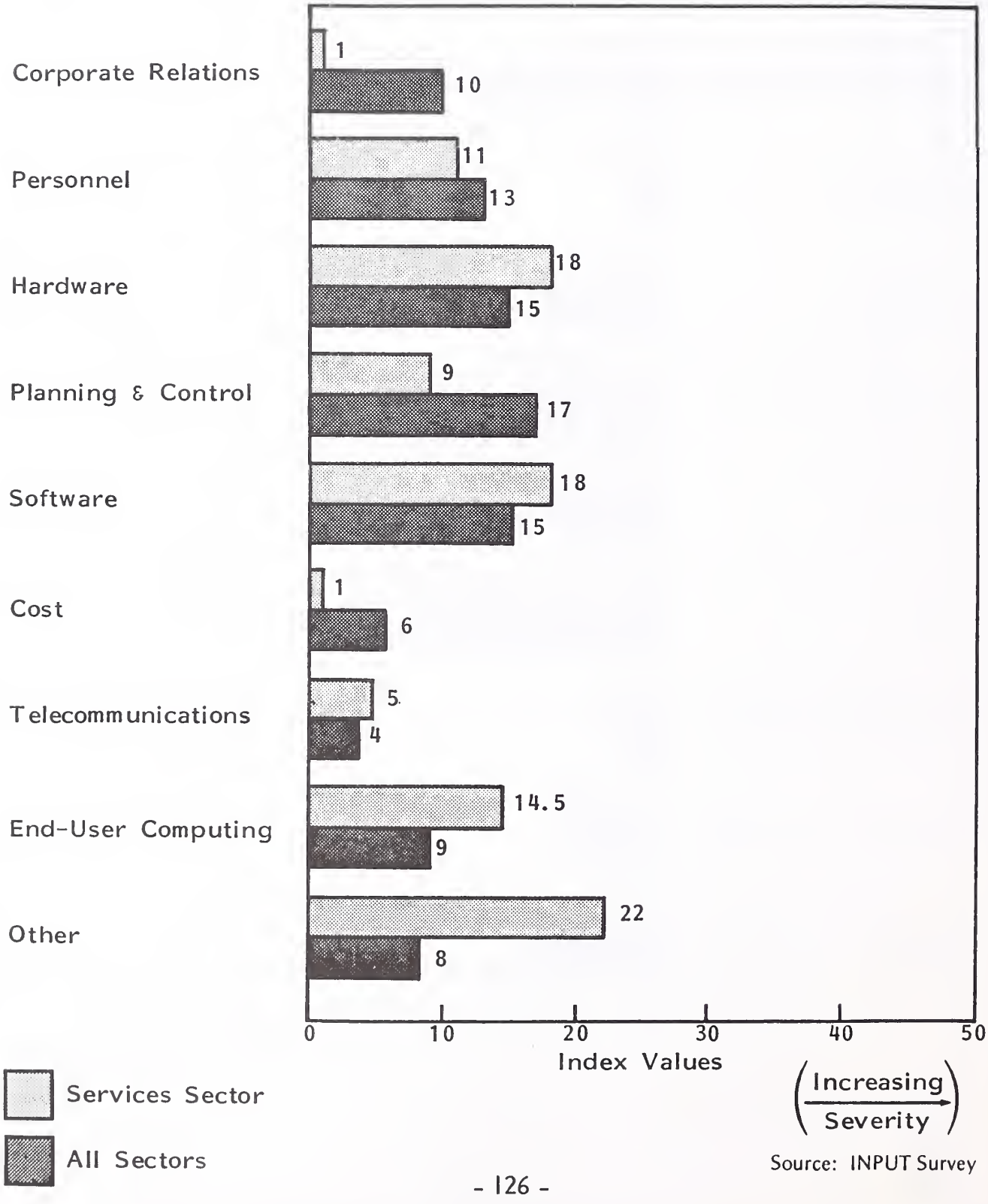
RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE SERVICES SECTOR



Source: INPUT Survey

EXHIBIT V-39

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE SERVICES SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Problems of hardware, software, and end-user computing were rated as more severe than in other industries.

- Personnel, the highest-rated problem last year, is now fifth. Finding qualified personnel is the main element of concern in this category.

- The relatively low regard for cost issues is in stark contrast to the concerns of senior management.

- Corporate relations causes the industry the least concern and received the lowest rating of any sector.

- Exhibit V-40 shows the issue subgroups that were rated as top problems in this sector.

c. Objectives

- Accomplishment of software objectives is extremely important to the services sector; the next most important objectives, those dealing with hardware and end-user computing are rated less than half as high, as shown in Exhibit V-41.

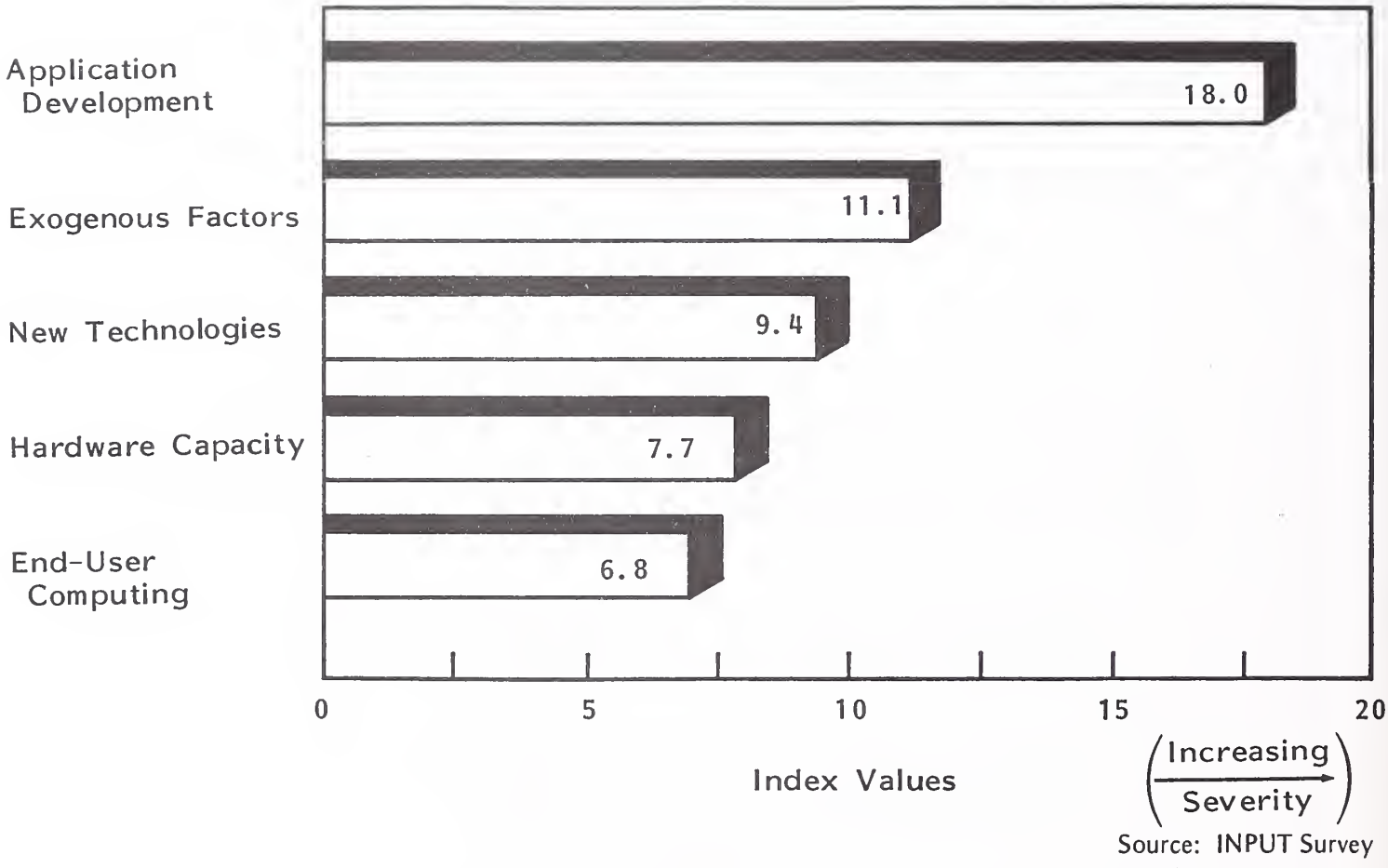
  - Accomplishment of software application development and upgrades objectives are rated especially high.

  - Within the hardware category, managers express the greatest interest in disaster recovery.

- Corporate relations objectives, especially those dealing with users, are also rated high. This is in marked contrast to the problem ranking. Personnel objectives are rated the lowest.

EXHIBIT V-40

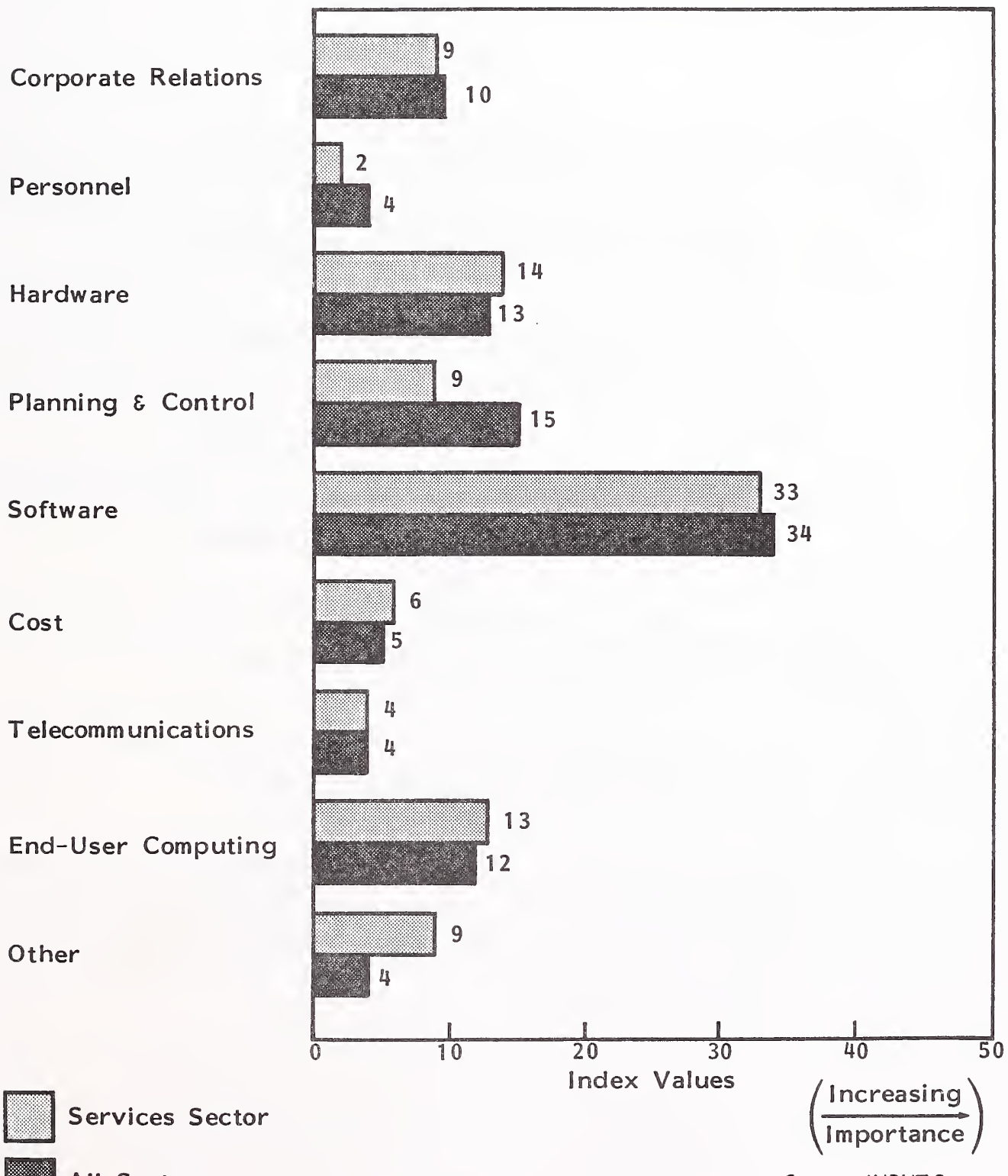
TOP FIVE INFORMATION SYSTEMS
PROBLEMS FOR THE SERVICES SECTOR
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-41

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE SERVICES SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Exhibit V-42 contains the top objectives for this sector. These objectives are at the planning issue subgroup level of detail.

- Exhibit V-43 shows the issues in descending order of objective priority and in contrast to problems, senior management concerns, and significant areas of change affecting IS in the next three years. Note that objectives align fairly well with problems and changes--but not with senior management concerns--for every category.

3. APPLICATIONS

- The top five information systems applications planned by managers in the services industry are shown in Exhibit V-44 for internally developed and supported applications and in Exhibit V-45 for external applications.

  - Thirty-one percent of the internal applications are specific to the services sector, and 12% of the external applications are industry specific.

  - Since this sector provides services to many other industry sectors, this distribution is reasonable.

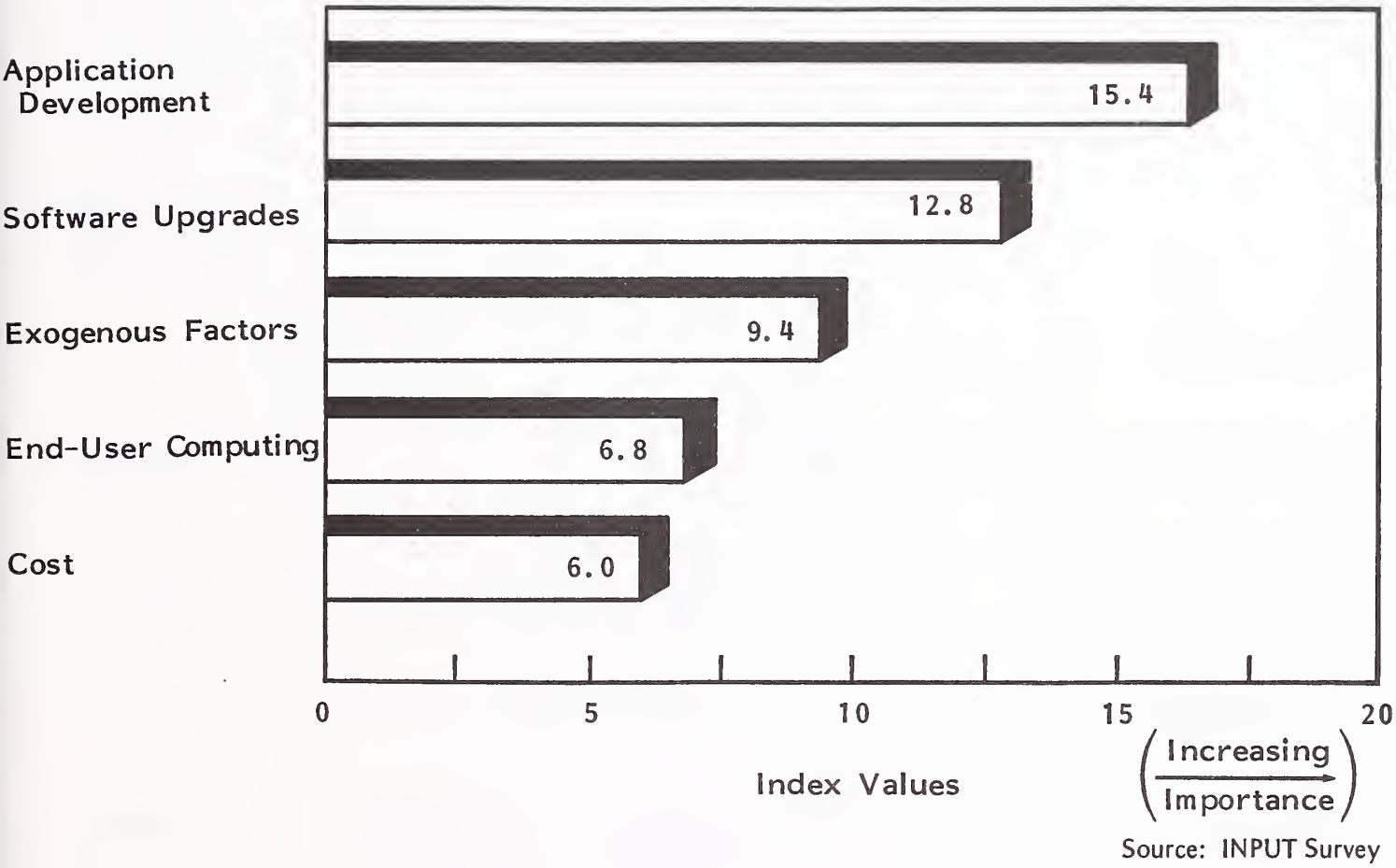
- Internally developed and supported applications focus primarily on the standard accounting, finance, and personnel applications.

  - Due to the breadth of services provided, these applications are mostly supporting the financial segment of the company.

  - General banking applications reflect the growing prevalence of banking applications by service companies. These companies are attempting to tap the market potential that deregulation of banking and financial institutions has provided.

EXHIBIT V-42

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE SERVICES INDUSTRY
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

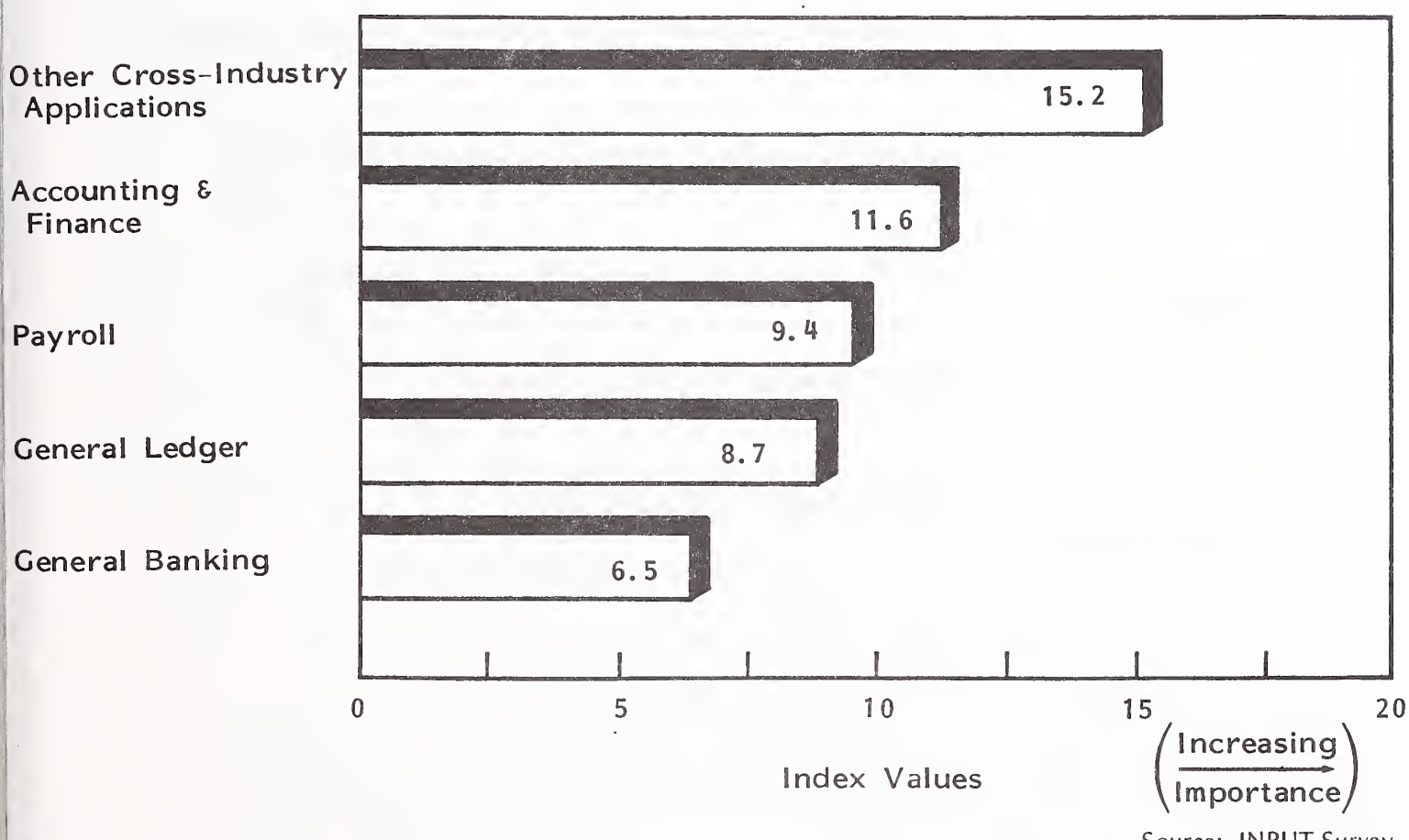
EXHIBIT V-43

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES FOR THE SERVICES SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	Very High	Medium	Low	Very High
Hardware	Medium	Medium	Low	Medium
End-User Computing	Medium	Medium	Low	High
Planning & Control	Low	Low	Medium	Medium
Corporate Relations	Low	Low	Low	Low
Other	Low	High	High	Medium
Cost	Low	Low	High	Low
Telecommunications	Low	Low	Low	Low
Personnel	Low	Medium	Low	Low

EXHIBIT V-44

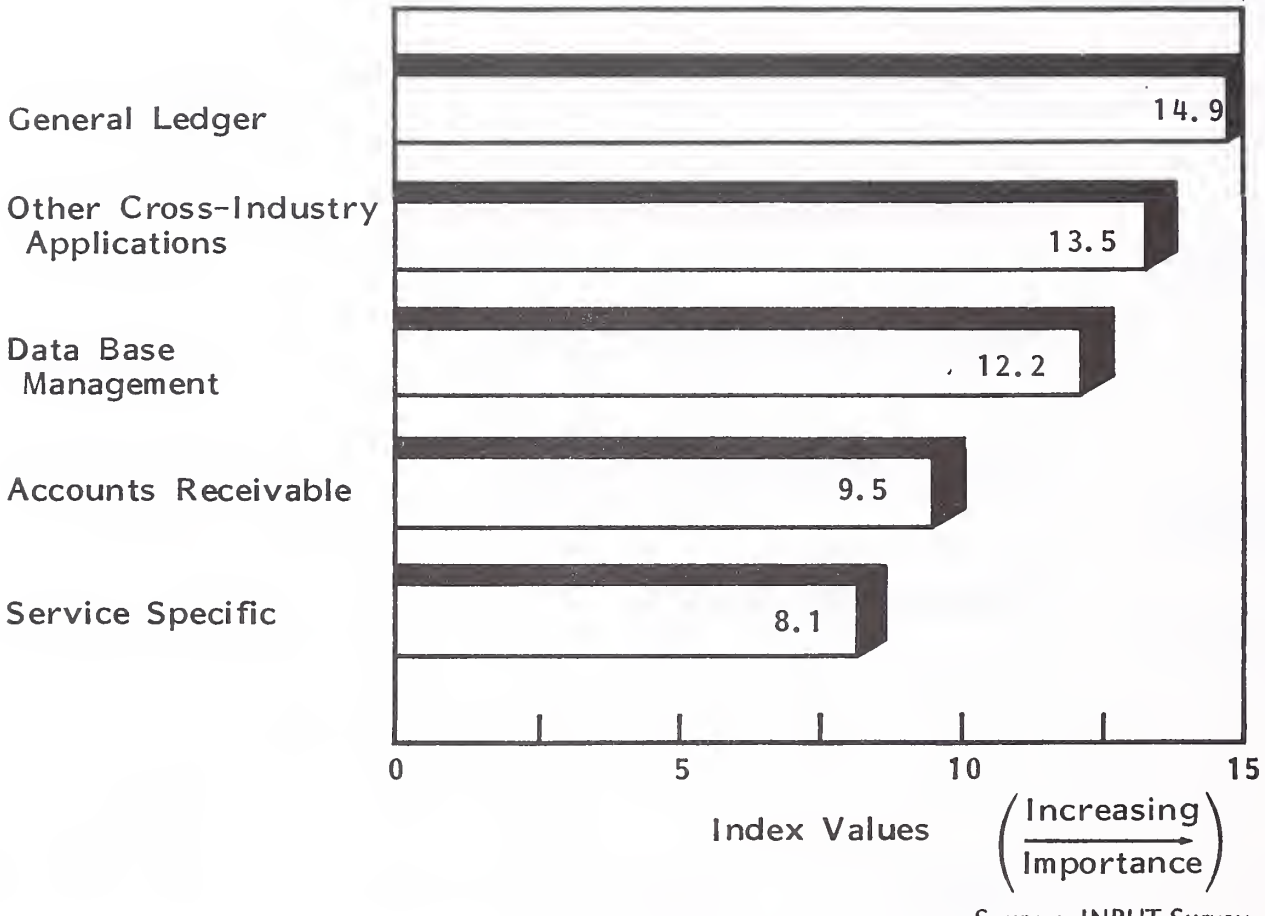
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE SERVICES INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-45

RELATIVE IMPORTANCE OF TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE SERVICES INDUSTRY
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- External systems are mainly accounting and support packages.

  - Data base packages reflect packages available on all sizes of computers, including micros.

  - Other cross-industry applications include government compliance reporting systems and communication applications such as micro-mainframe links (e.g., VisiAnswer).

G. UTILITIES SECTOR

1. BUDGET ANALYSIS

- Ninety-one percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Nine percent expect budgets to remain the same, and none expect decreases.

- The average budget growth expected in 1985 is 14.0%.

  - In 1984 budget growth was 12%.

  - The expected budget growth in 1985 for all industries is 11%.

- Exhibit V-46 shows the distribution of expenses in utilities information systems budgets.

- The utilities sector budget breakdown closely parallels the average of all industries.

  - At 40%, personnel expenses dominate the budget.

  - Hardware expenses, at 32%, are the next largest, followed by software at 10%.

EXHIBIT V-46

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE UTILITIES SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	40.4%	7.8%
Mainframe Processors	9.6	5.0
Minicomputers	2.3	20.3
Microcomputers	1.5	10.9
Mass Storage Devices	5.2	12.2
Terminals	5.6	1.3
Peripherals	7.3	(0.6)
Total Hardware	31.5%	5.9%
Communications	7.4	7.4
External Software	3.8	7.2
Custom Programming	4.5	1.6
Integrated Systems	2.1	0.0
Total Software	10.4%	3.2%
Software Maintenance	5.3	(0.4)
Hardware Maintenance	0.9	10.8
Total Maintenance	6.2%	1.2%
Outside Processing Services	1.6	0.0
Other	2.5	6.2
Total	100.0%	14.0%

- The largest increase in expenditures expected in 1985 is in minicomputers, which is projected to increase by over 20%.

- Information systems budgets, as a percent of total utilities corporate revenue, is 2.8%. This is significantly above the 0.8% average for all industries.

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Senior management concerns about information systems issues in the utilities sector parallel those of other industries, as shown in Exhibit V-47.

  - Cost is the largest concern but is on par with this concern in other industries.

  - Corporate relations, hardware, and planning and control issues are viewed as being nearly as important as cost.

    - Corporate relations and hardware are significantly more important in this sector than in other industries.

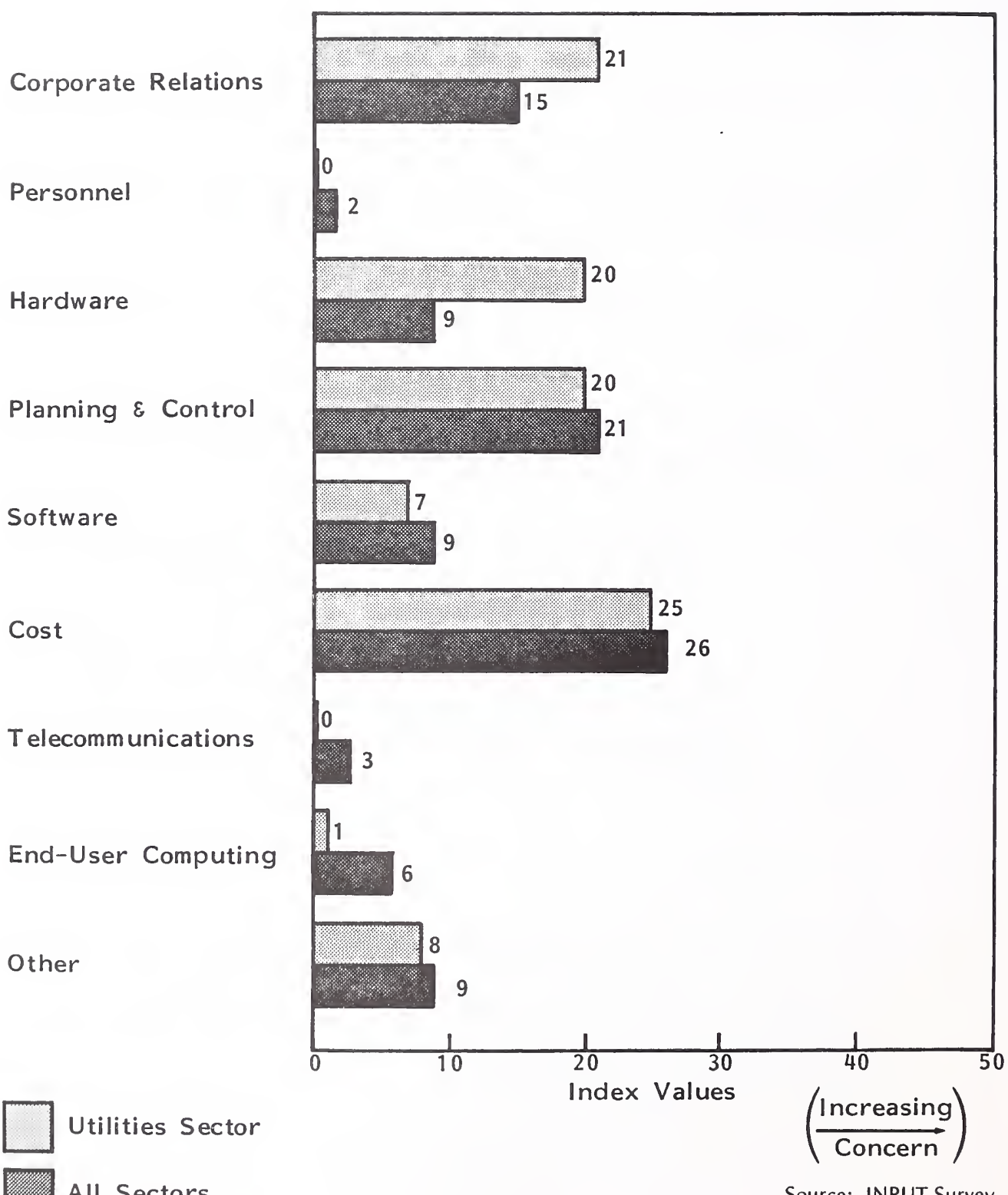
    - Senior executives for this sector have broadened their area of interest in IS beyond cost and appear to have taken greater interest in the IS operation than most other industry executives do.

b. Problems

- Senior information systems management in the utilities sector see planning and control as their number one problem, as shown in Exhibit V-48. This sector rates it higher as a concern than do any other industry sectors--except discrete and process manufacturing.

EXHIBIT V-47

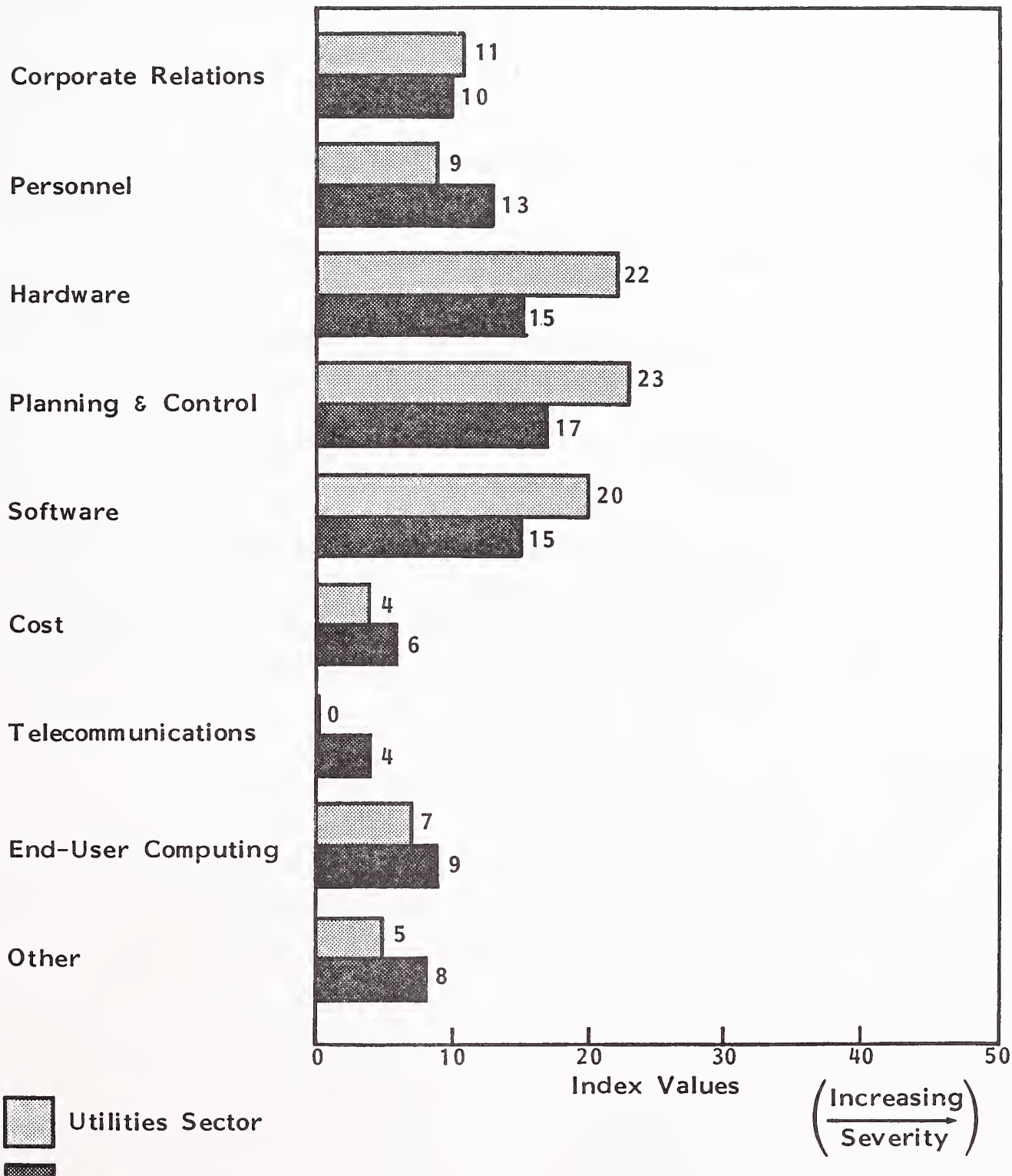
RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE UTILITIES SECTOR



Source: INPUT Survey

EXHIBIT V-48

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE UTILITIES SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Software and hardware problems also are regarded as nearly as severe as cost by this sector's executives.

  - Application development and software upgrades were the most severe software problems.

  - Security and disaster recovery issues were main hardware concerns.

- The relatively low regard for cost issues is in stark contrast to the concerns of senior management.

- Telecommunication issues cause the industry the least concern; only one other sector, medical, rates it so low.

- Exhibit V-49 shows the planning issue subgroups that were rated as top problems in this sector.

c. Objectives

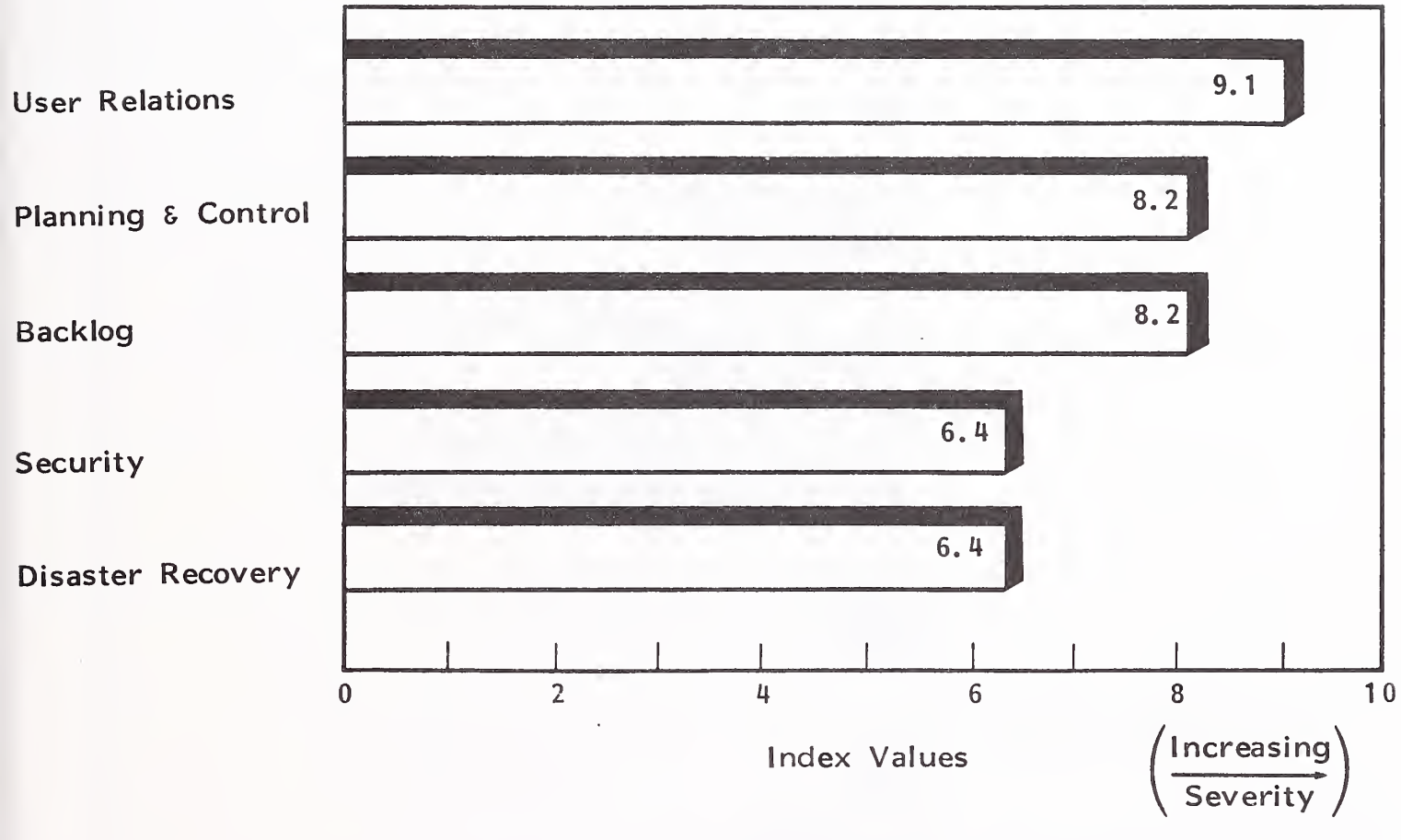
- Accomplishment of software objectives is extremely important to utilities, although this sector rates it lower than other industries do. The next most important objectives, those dealing with hardware and planning and control issues, are significantly more important to utilities than to other industries, as shown in Exhibit V-50.

  - Proper capacity planning was a key hardware objective.

  - Managers were concerned with all aspects of planning and control. Objectives in this issue group focused on management controls and development backlog reduction.

EXHIBIT V-49

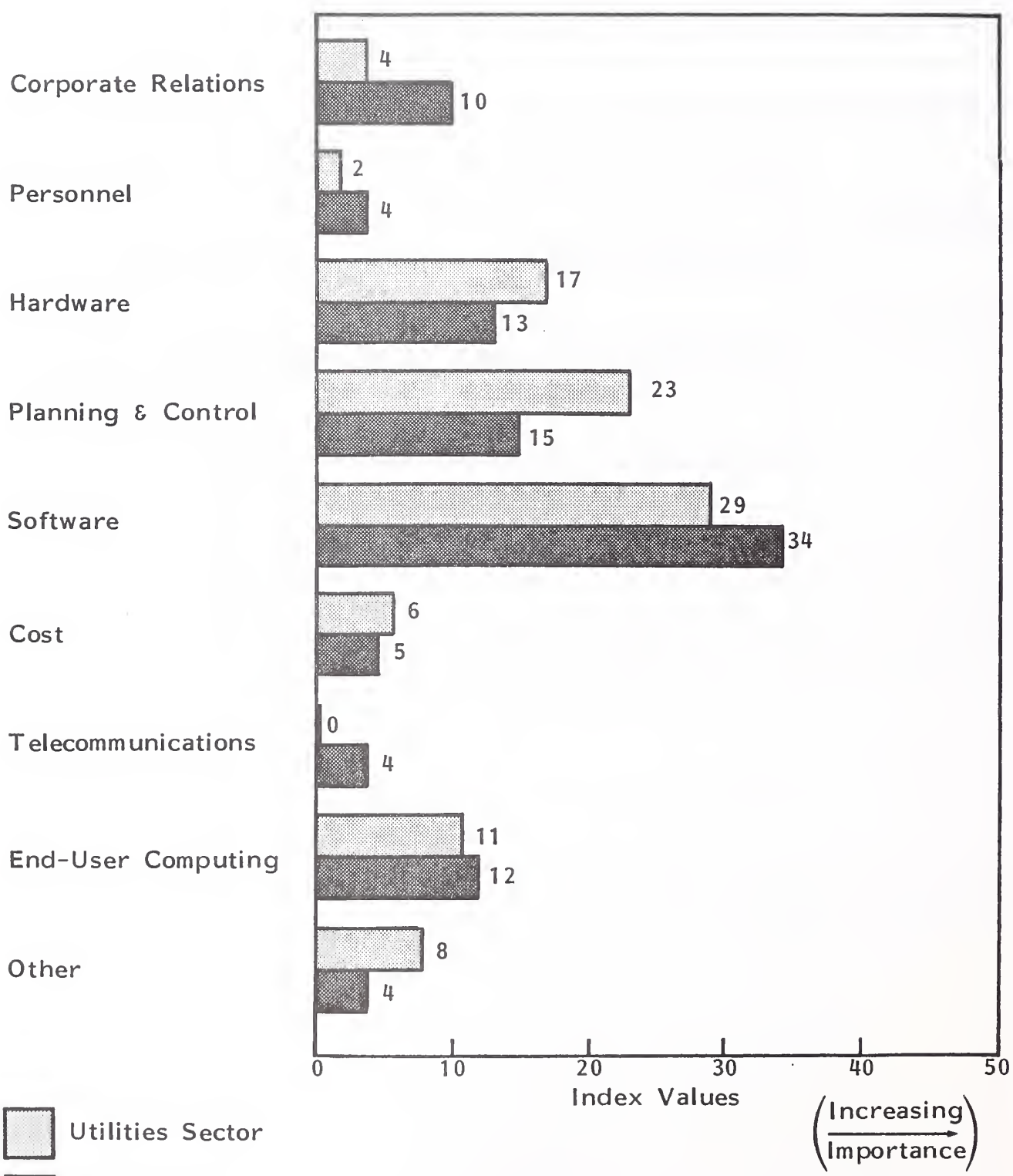
TOP FIVE INFORMATION SYSTEMS PROBLEMS FOR THE UTILITIES SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-50

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE UTILITIES SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- End-user computing objectives, especially those dealing with office systems, are also rated high. Telecommunications objectives are rated lowest.

- Exhibit V-51 contains the top objectives for this sector. These objectives are at the planning issue subgroup level of detail.

- Exhibit V-52 lists the issues in decreasing order of importance as IS priorities. The objective priority is compared to the issue's importance as an IS problem, senior management concern, and future impact on IS. The utilities objectives match fairly well with perceived IS problems, but they do not adequately address senior management concerns. The objectives seem to address the major changes that may impact IS in the near future.

3. APPLICATIONS

- Approximately 35% of the internally developed and 29% of the externally developed systems were industry specific.

  - The most important industry-specific internal systems are:

    . Customer information systems.

    . Materials management systems.

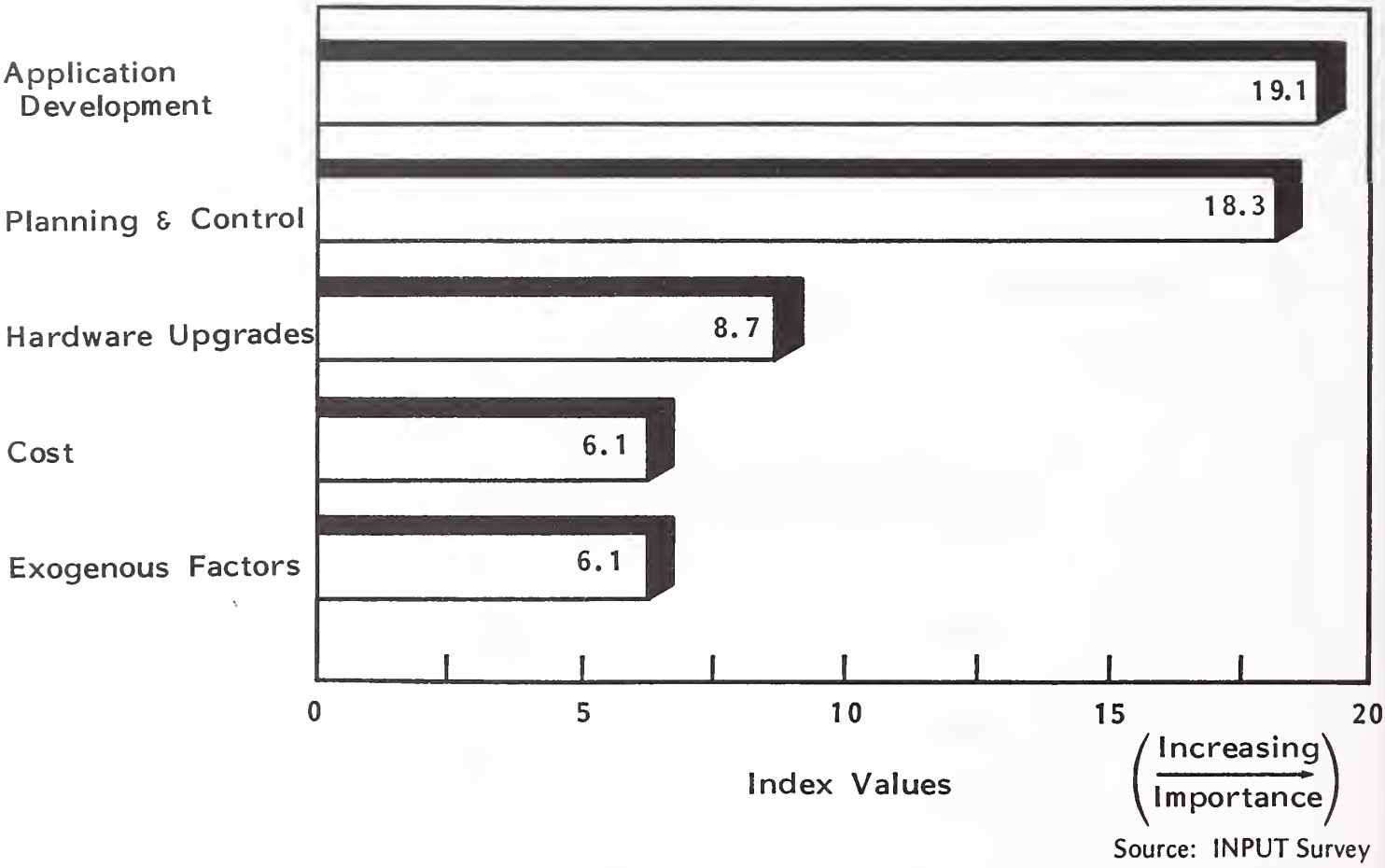
  - The single most important external industry-specific application is materials management.

- Cross-industry applications are the standard payroll and accounting systems for both internal and external systems. Government compliance reporting is also included in the top five external systems.

  - Due to the continually changing regulations, these systems are typically supported by sources outside the company.

EXHIBIT V-51

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE UTILITIES INDUSTRY
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-52

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES FOR THE UTILITIES SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	High	High	Low	Medium
Planning & Control	High	High	High	Medium
Hardware	Medium	High	High	High
End-User Computing	Medium	Low	Low	Very High
Other	Low	Low	Low	Low
Cost	Low	Low	High	Low
Corporate Relations	Low	Medium	High	Low
Personnel	Low	Low	Low	Low
Telecommunications	Low	Low	Low	Low

- Litigation support systems are beginning to appear in many of the larger utilities. These are also usually developed and maintained by outside sources.

- Exhibits V-53 and V-54 show the relative importance of the top five applications developed internally and externally, respectively.

H. DISTRIBUTION SECTOR

1. BUDGET ANALYSIS

- Eighty-one percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Four percent expect budgets to remain the same, and 15% expect decreases.

- The average budget growth expected in 1985 is 8%.

  - In 1984 budget growth was 10%.

  - The expected budget growth in 1985 for all industries is 11%.

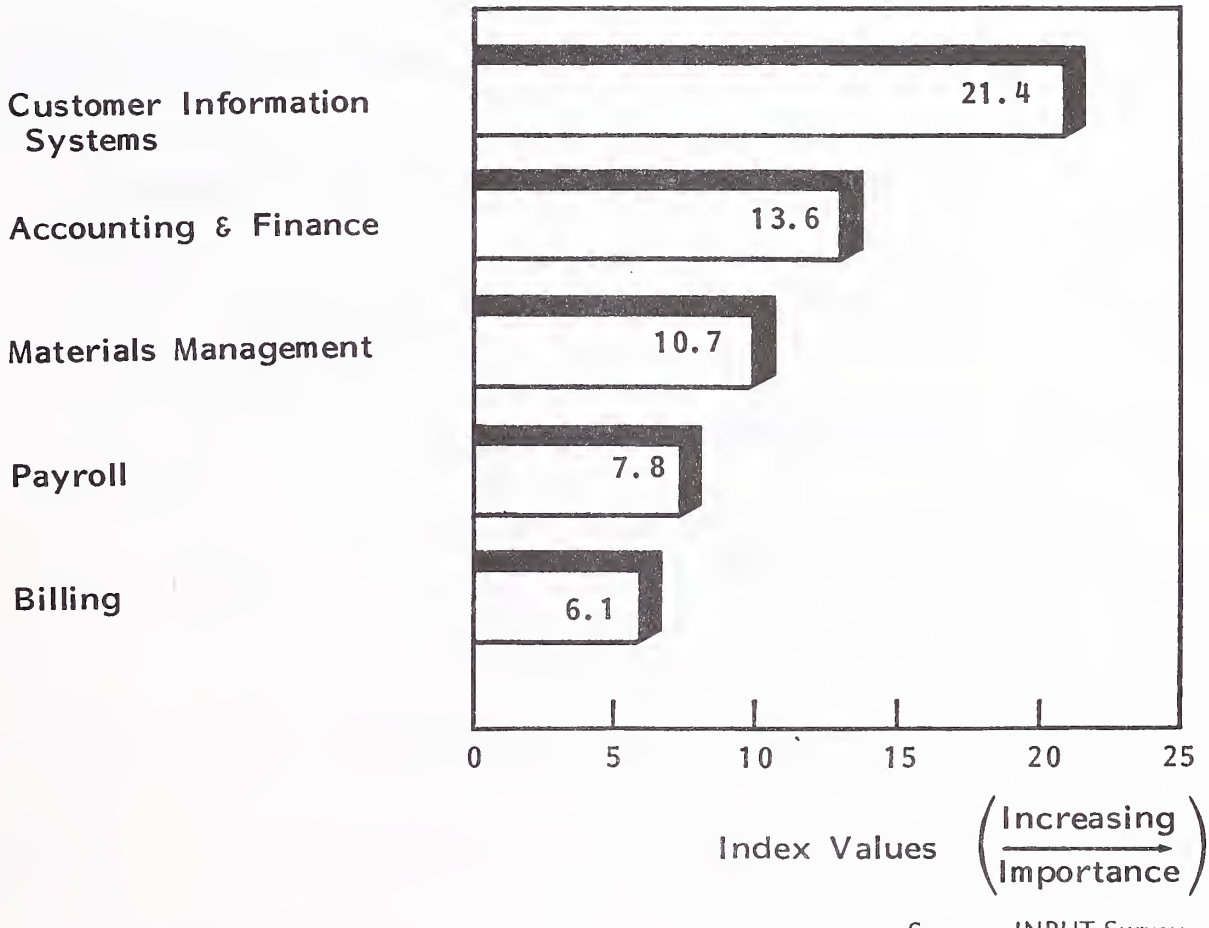
- Exhibit V-55 shows the distribution of expenses in distribution information systems budgets.

- The distribution sector budget breakdown parallels the average of all industries.

  - At 39%, personnel expenses dominate the budget.

EXHIBIT V-53

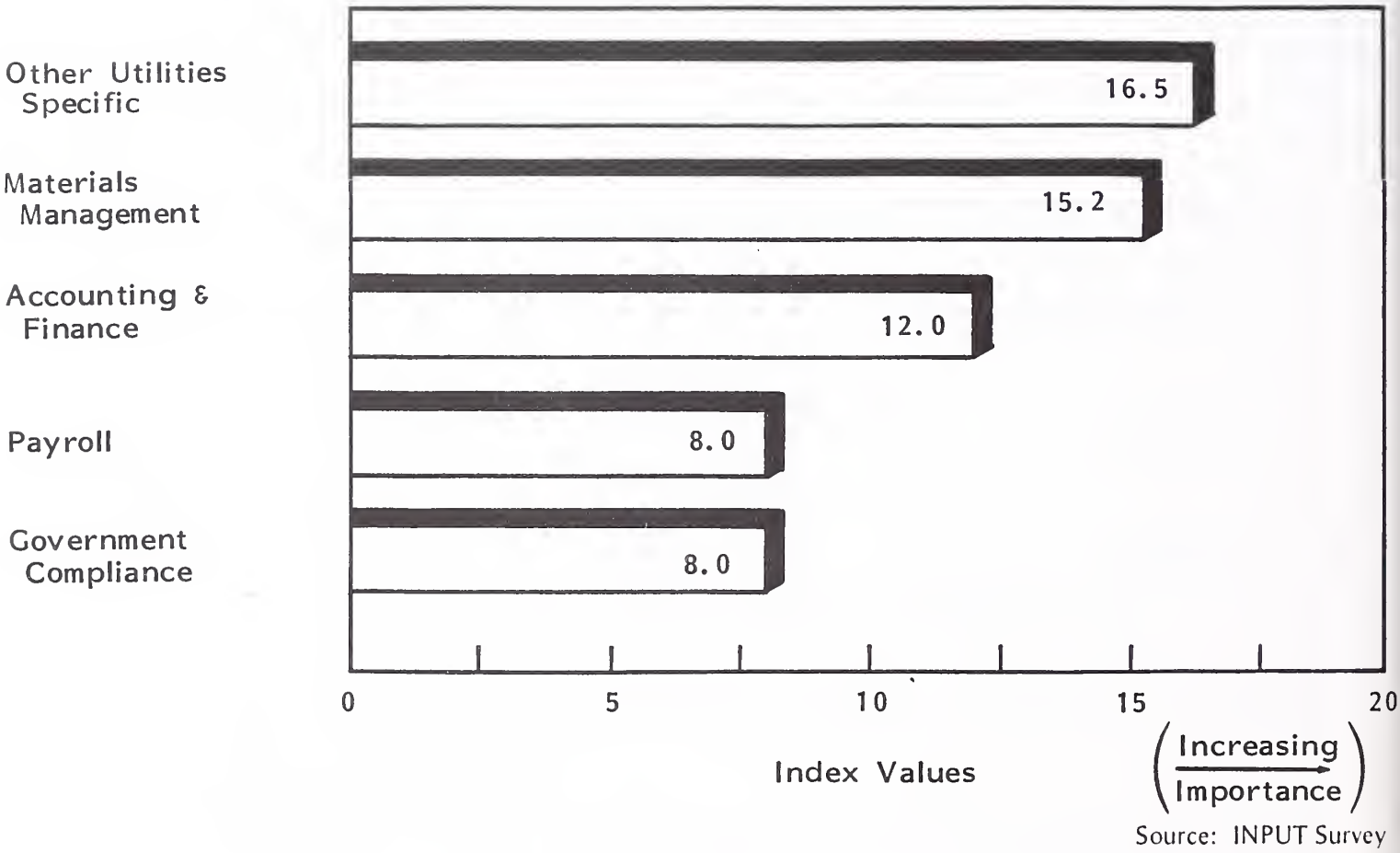
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE UTILITIES INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-54

RELATIVE IMPORTANCE OF TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE UTILITIES INDUSTRIES
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-55

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE DISTRIBUTION SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	38.7%	4.1%
Mainframe Processors	7.3	4.5
Minicomputers	8.0	17.7
Microcomputers	1.3	9.6
Mass Storage Devices	2.5	28.5
Terminals	3.0	(1.5)
Peripherals	2.8	0.8
Total Hardware	24.9%	6.2%
Communications	9.7	4.6
External Software	4.8	7.8
Custom Programming	2.2	6.0
Integrated Systems	5.9	0.0
Total Software	12.9%	3.9%
Software Maintenance	1.2	9.4
Hardware Maintenance	4.0	6.8
Total Maintenance	5.2%	7.3%
Outside Processing Services	3.8	11.6
Other	4.8	4.5
Total	100.0%	8.4%

- Hardware expenses, at 25%, are the next largest, followed by software at 13%.

- The largest increase in expenditures expected in 1985 is mass storage devices which is projected to increase by more than 28%.

  - This projection more than doubles the projected increase for all other industries. This is possible due to the vast storage requirements of point-of-sale systems.

  - The external use of point-of-sale systems will also increase the demand for minicomputers. The acquisition of microcomputers will increase at 10%, but this growth will be less than in other industries; the use of intelligent workstations has dampened the growth of micros.

- Information systems budgets as a percent of total distribution corporate revenue is 0.5%. This closely resembles the 0.8% average for all industries.

2. INFORMATION SYSTEMS PLANNING ISSUES

   a. Senior Management Concerns

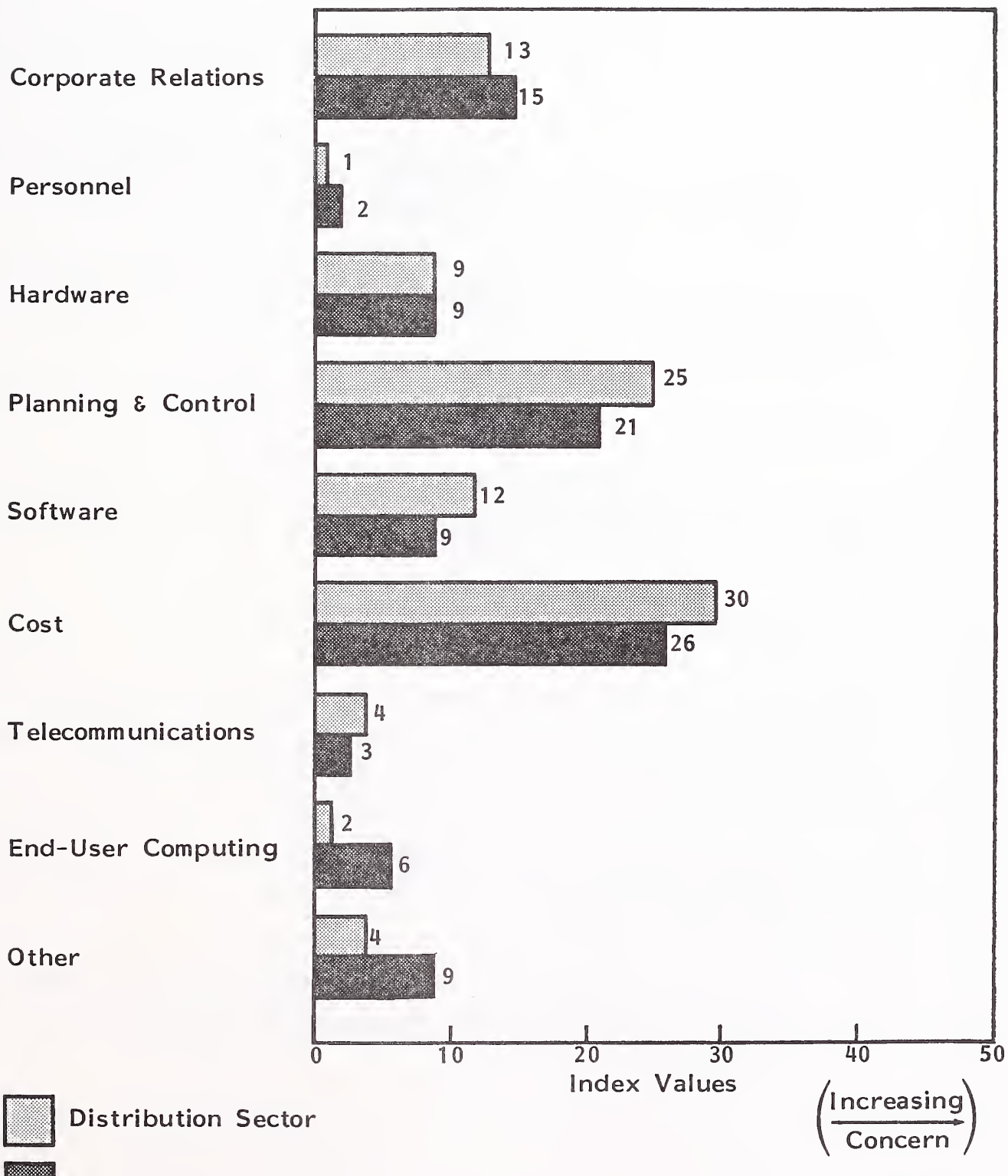
- Concern about information systems issues expressed by senior distribution executives closely parallels that of other industries, as shown in Exhibit V-56.

  - Cost is the dominant issue for senior management.

  - Planning and control issues are also considered important. The gap between these issues and cost has narrowed significantly since last year.

EXHIBIT V-56

RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE DISTRIBUTION SECTOR



Source: INPUT Survey

b. Problems

- Senior information systems managers in the distribution sector consider software their number one problem, as shown in Exhibit V-57.

- Planning and control, hardware, and personnel also are regarded as major problems by distribution companies.

  - Application development and backlog rate as the top problems for IS distribution managers.

  - Hardware in general is a key concern, and finding qualified staff heads the personnel problems.

- The relatively low regard for cost issues is in stark contrast to the concerns of senior management.

- Telecommunications pose the least problem to the industry.

- Exhibit V-58 shows the planning issue subgroups that were rated as top problems in this sector.

c. Objectives

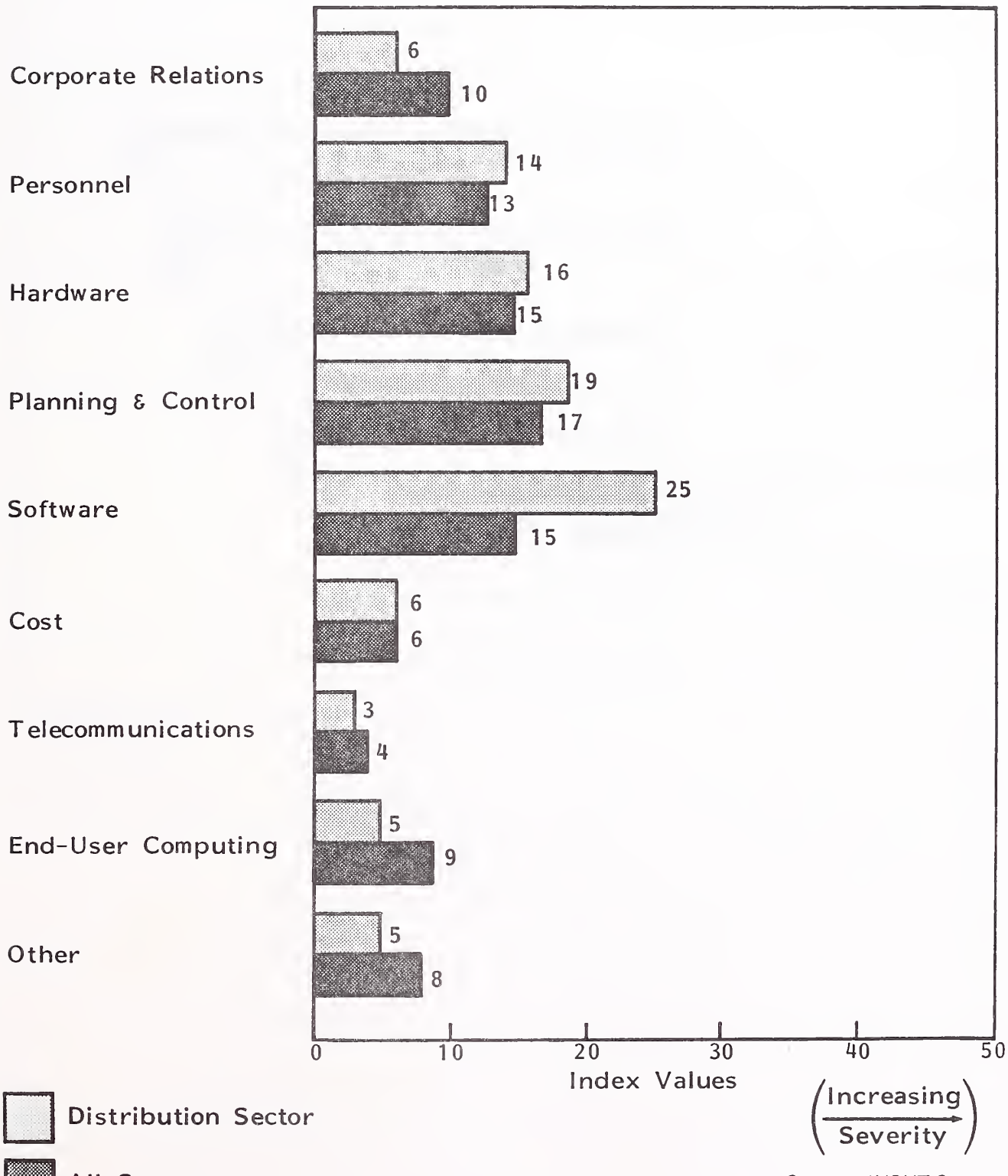
- Accomplishment of software objectives is the highest priority to distribution IS managers; the next most important objectives, those dealing with planning and control, are rated nearly half as high, as shown in Exhibit V-59.

  - Accomplishment of software applications development objectives is rated especially high.

  - Within the planning and control category, managers express the greatest interest in general planning issues and reducing application backlog.

EXHIBIT V-57

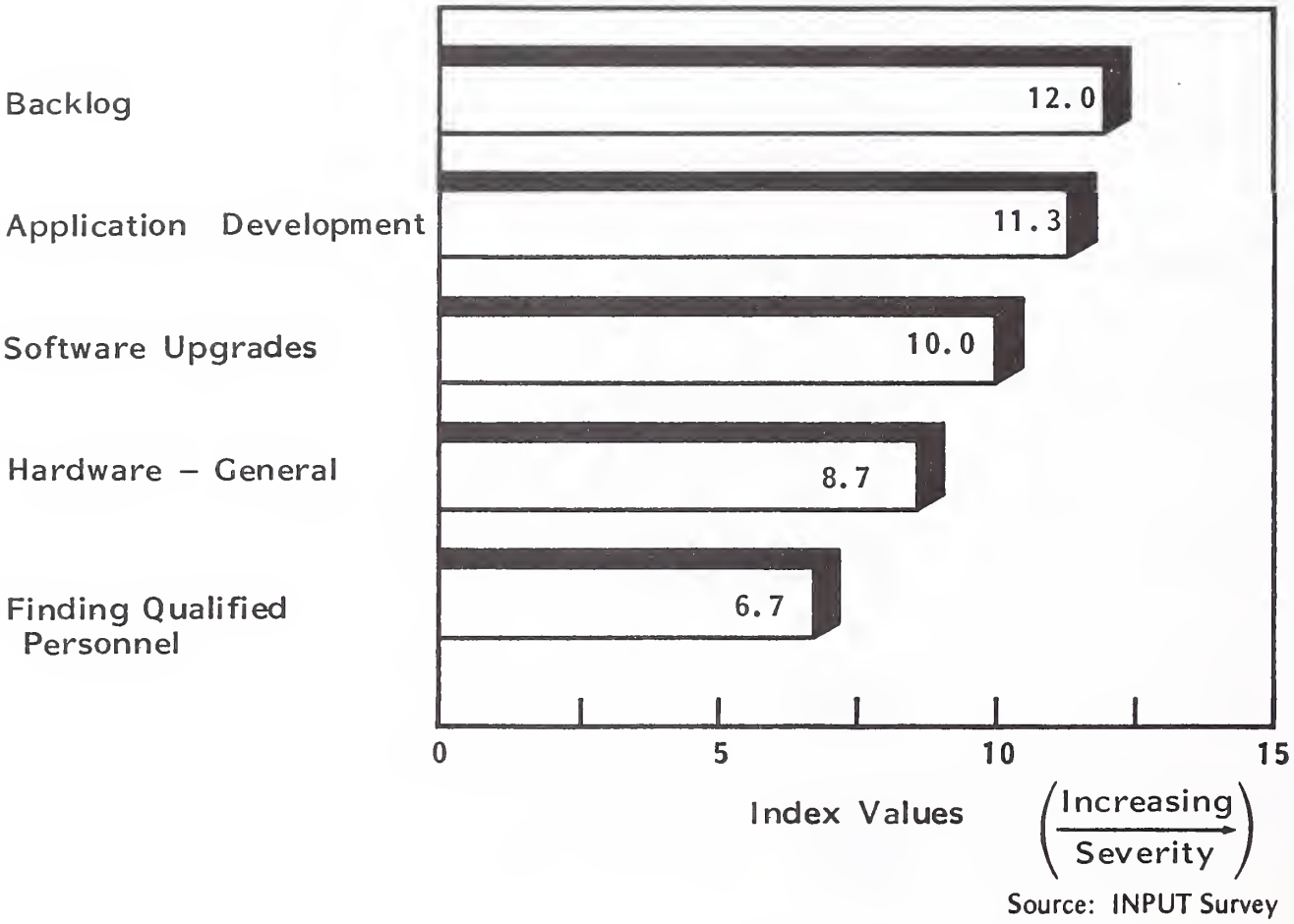
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE DISTRIBUTION SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-58

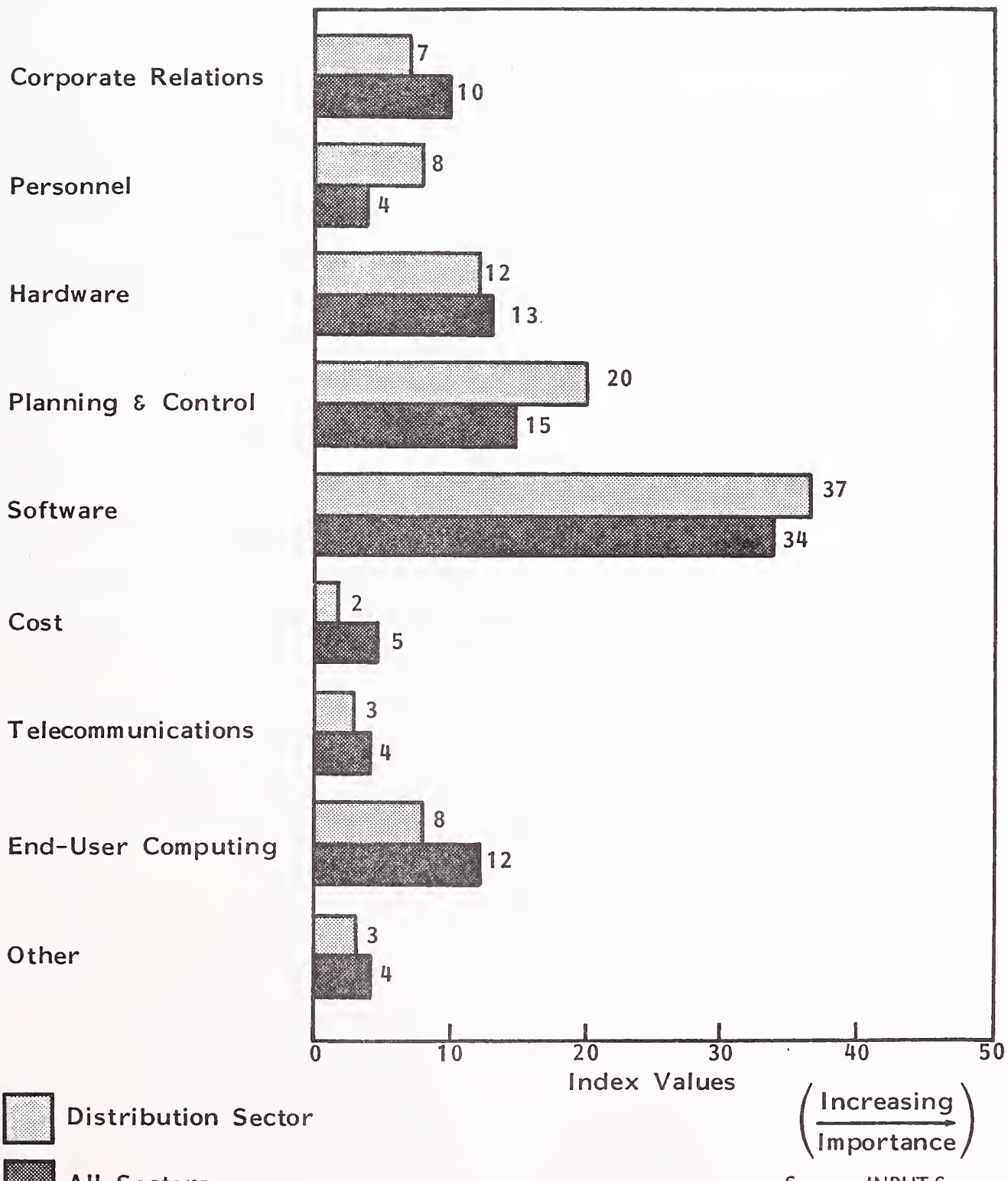
TOP FIVE INFORMATION SYSTEMS
PROBLEMS FOR THE DISTRIBUTION SECTOR
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-59

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE DISTRIBUTION SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Hardware objectives, especially those dealing with capacity planning, are also rated high.

- Cost objectives are rated lowest.

- Exhibit V-60 contains the top objectives for this sector. These objectives are at the planning issue subgroup level of detail.

- Exhibit V-61 lists the issue groups in descending order of priority for objectives set by IS managers in this sector. These are compared to IS problems, senior management concerns, and the significance of the issue groups as an area of change in the next three years. The IS managers in this industry have assigned priorities for objectives in an attempt to satisfy all highly important problems, concerns, and changes. They have, however, assigned lowest priority to cost-related issues. This oversight in planning occurs consistently in all industry sectors.

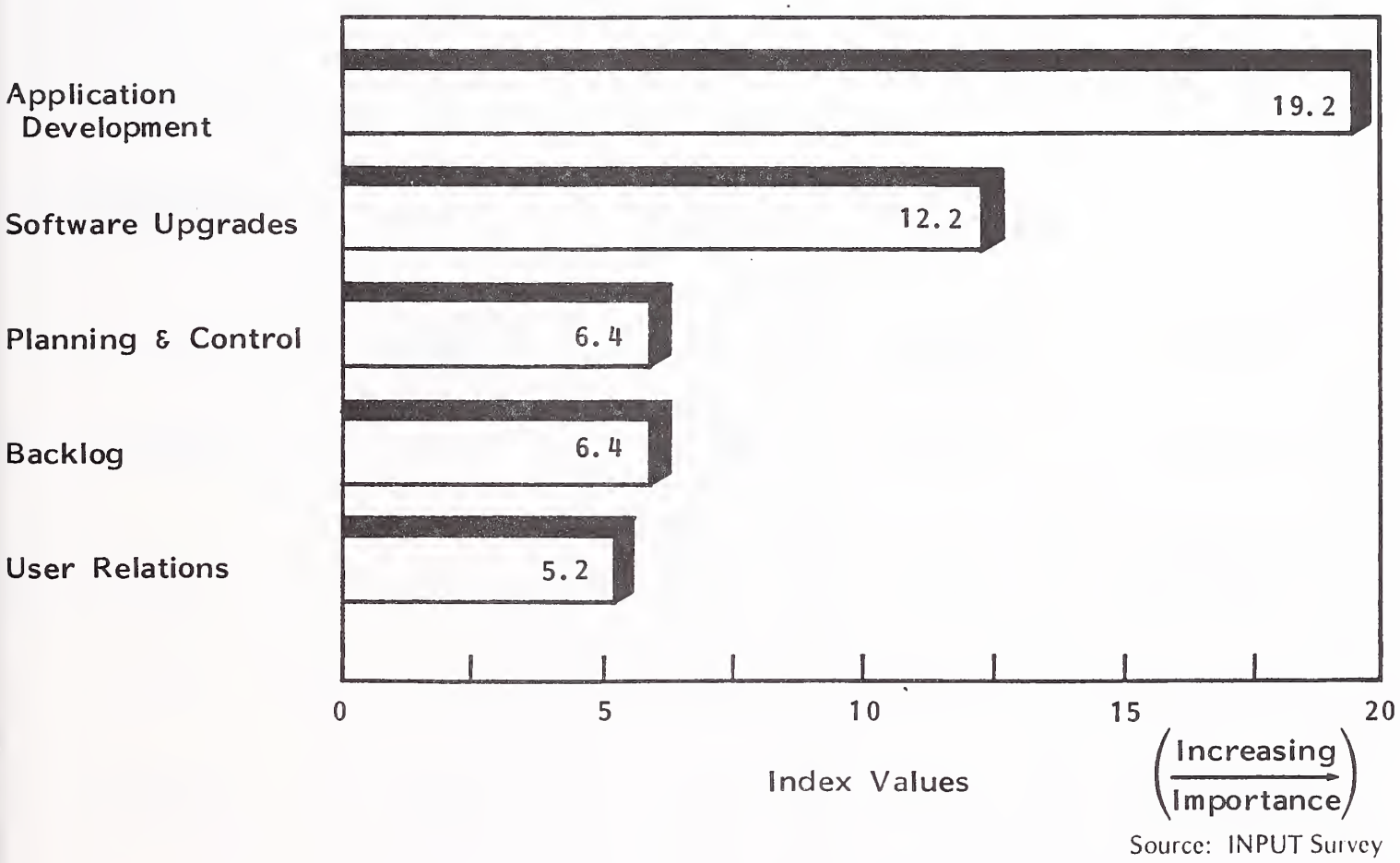
3. APPLICATIONS

- Thirty-eight percent of internally developed applications and 18% of externally developed applications are industry specific in this sector. This is significantly below the average of 43% and 34% respectively for all industries.

- Exhibits V-62 and V-63 show the top five internal and externally developed applications. Note the similarity in the lists. Also note that no industry-specific applications are listed (with the possible exception of inventory control, which can be used as industry specific).

EXHIBIT V-60

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE DISTRIBUTION INDUSTRY
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

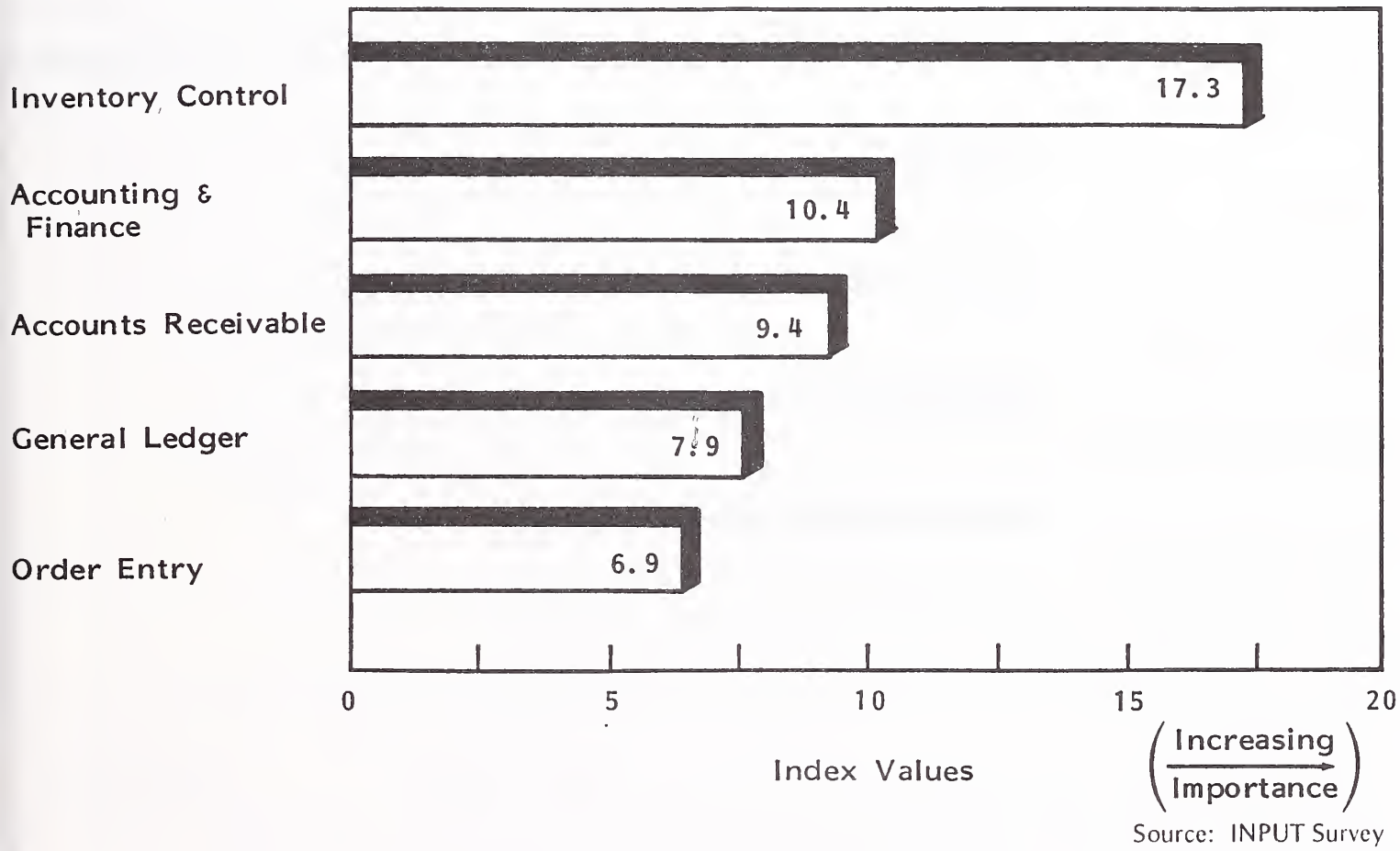
EXHIBIT V-61

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES FOR THE DISTRIBUTION SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	Very High	High	Medium	Very High
Planning & Control	High	Medium	High	Low
Hardware	Medium	Medium	Low	Medium
End-User Computing	Low	Low	Low	Medium
Personnel	Low	Medium	Low	Low
Corporate Relations	Low	Low	Medium	Medium
Telecommunications	Low	Low	Low	Low
Other	Low	Low	Low	Medium
Cost	Low	Low	Very High	Low

EXHIBIT V-62

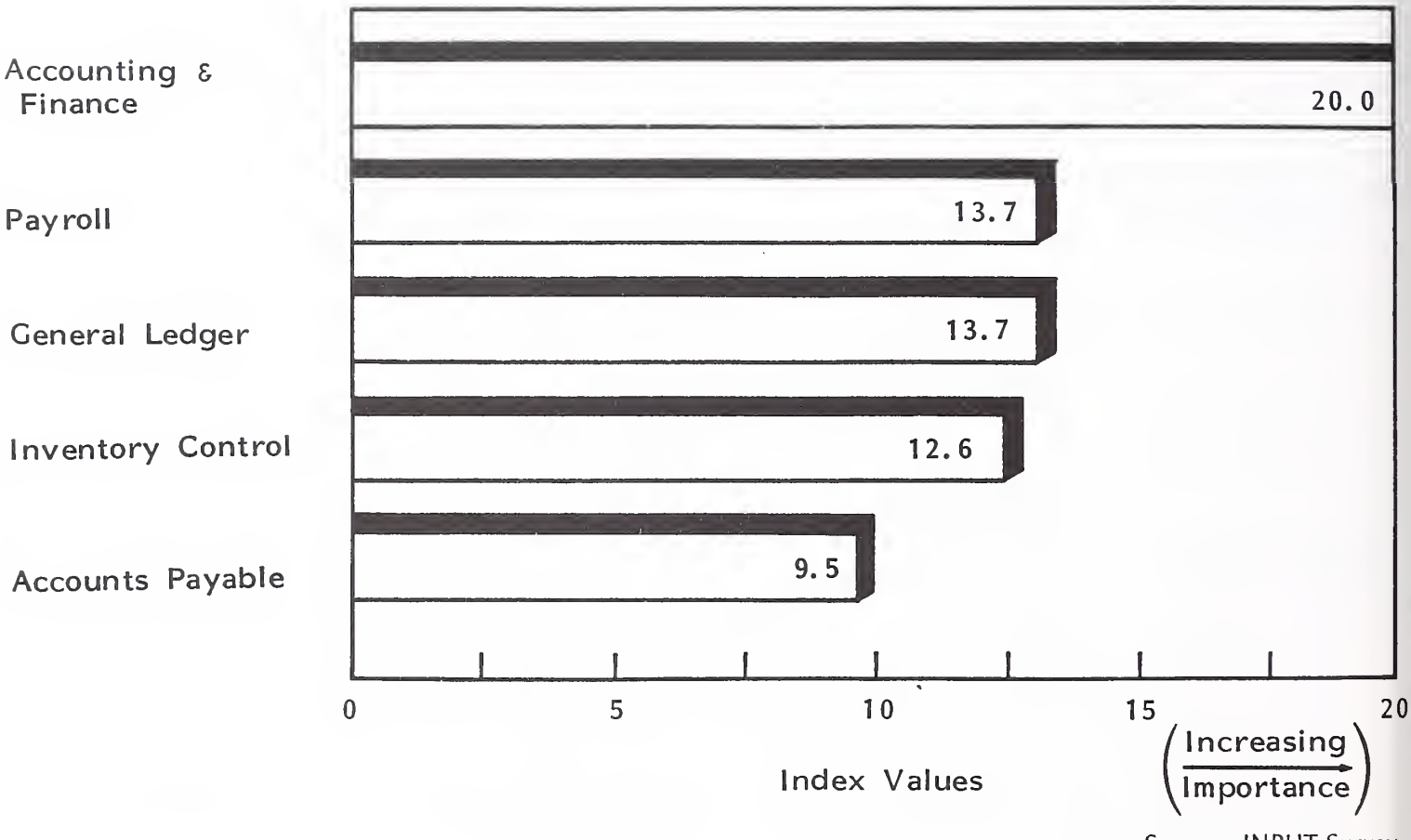
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE DISTRIBUTION INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-63

RELATIVE IMPORTANCE OF TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE DISTRIBUTION INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

I. BANKING AND FINANCE SECTOR

1. BUDGET ANALYSIS

- Eighty-eight percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Eight percent expect budgets to remain the same, and 4% expect decreases.

- The average budget growth expected in 1985 is 9%.

  - In 1984 budget growth was 10%.

  - The expected budget growth in 1985 for all industries is 11%.

- Exhibit V-64 shows the distribution of expenses in banking and finance information systems budgets.

- The banking and finance sector budget distribution closely parallels the average of all industries.

  - At 38%, personnel expenses dominate the budget.

  - Hardware expenses, at 24%, are the next largest, followed by communications at 12%.

- The largest increase in expenditures expected in 1985 is for minicomputer purchases which is projected to increase by nearly 22%.

  - This contrasts with the industry composite, where the biggest increase (18%) is in microcomputers.

EXHIBIT V-64

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE BANKING AND FINANCE SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	38.2%	7.0%
Mainframe Processors	7.8	5.4
Minicomputers	3.1	21.7
Microcomputers	2.5	10.9
Mass Storage Devices	2.6	11.4
Terminals	3.2	(1.1)
Peripherals	4.4	(1.4)
Total Hardware	23.6%	6.0%
Communications	11.7	19.1
External Software	3.4	6.9
Custom Programming	1.2	7.7
Integrated Systems	1.3	10.0
Total Software	5.9%	7.7%
Software Maintenance	0.9	8.6
Hardware Maintenance	4.6	0.1
Total Maintenance	5.5%	1.5%
Outside Processing Services	2.3	4.7
Other	12.8	4.6
Total	100.0%	8.6%

- Communication and mass storage device expenses are also expected to increase significantly--19% and 11% respectively.

- The large growth of the above expense categories reflects the high priority this sector's IS managers place on end-user computing and office systems in particular.

- Information systems budget for banking and finance is $3,729 per employee. This is significantly greater than the $1,060 per employee average for all industries. The banking and finance budget per employee amount is the second highest of all industries.

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Concern about information systems issues expressed by senior banking and finance executives closely parallels that of other industries, as shown in Exhibit V-65.

  - Cost is clearly the dominant issue for senior management.

  - Corporate relations, planning and control, and "other" (exogenous factors) issues were also considered important.

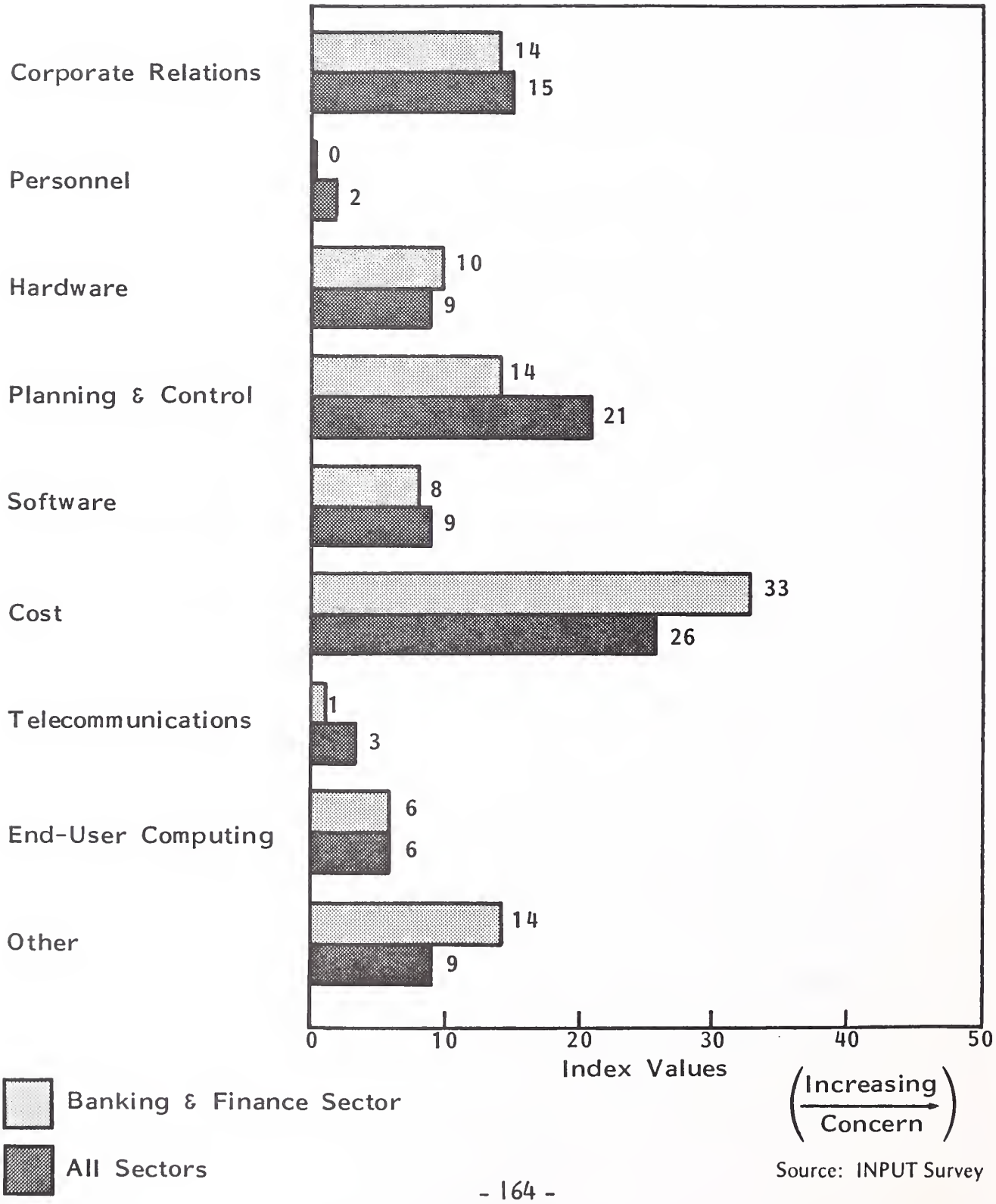
b. Problems

- Senior information systems managers in the banking and finance sector see corporate relations as their number one problem, as shown in Exhibit V-66. They rate it higher as a concern than does any other industry sector.

- Hardware, software, personnel, and planning and control also are regarded as major problems and are similar in importance to corporate relations.

EXHIBIT V-65

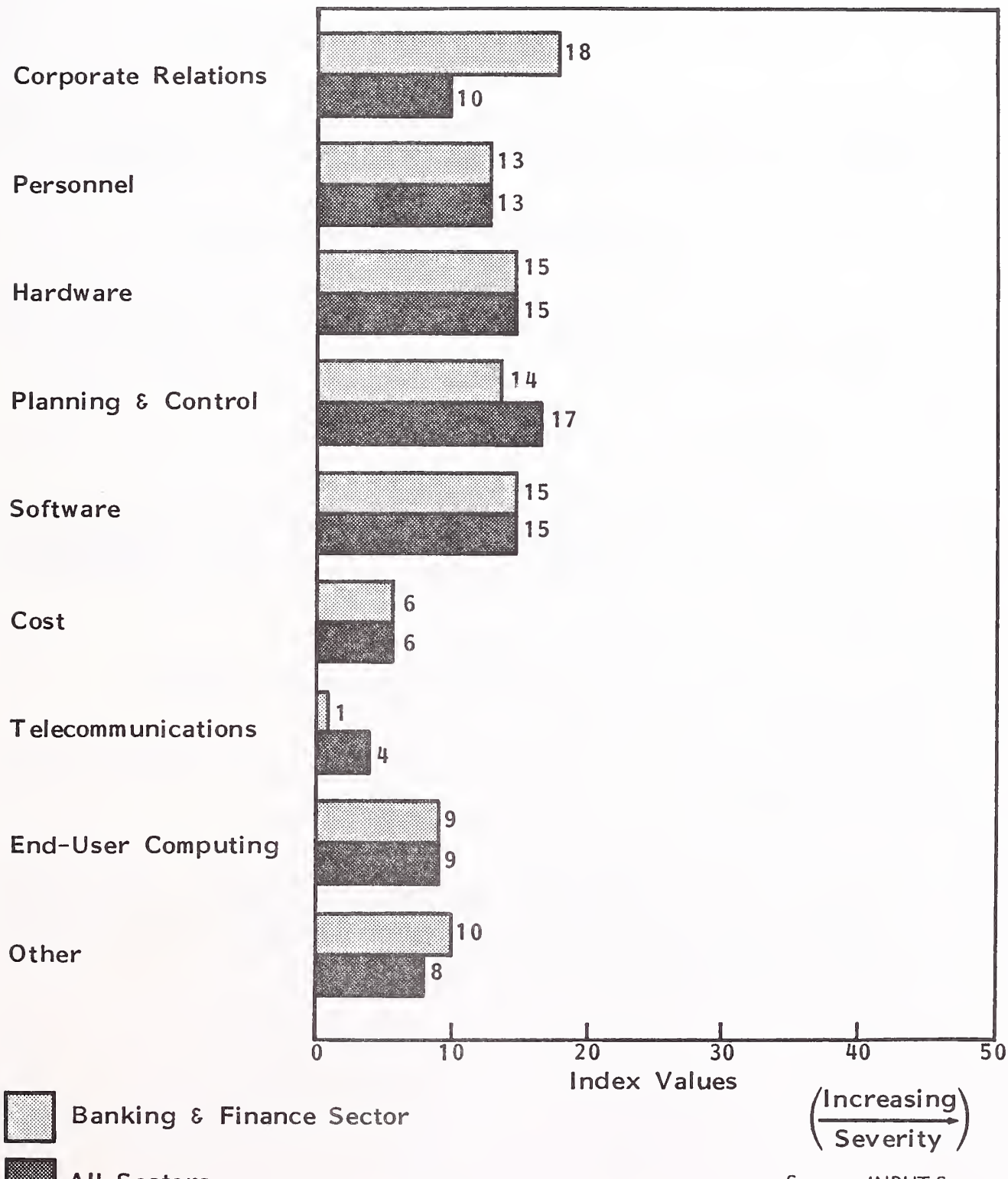
RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE BANKING AND FINANCE SECTOR



Source: INPUT Survey

EXHIBIT V-66

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE BANKING AND FINANCE SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- User relations are the top problem identified by banking and finance IS managers.

- Hardware capacity is the most severe hardware problem.

- Software upgrades are the top software problem.

- The most important personnel problem is staff turnover.

- The relatively low regard for cost issues is the same in this sector as in other sectors. This is in stark contrast to the concerns of senior management.

- Telecommunications poses the least problem for the industry.

- Exhibit V-67 shows the planning issue subgroups that were rated as top problems in this sector.

c. Objectives

- Hardware, end-user computing, planning and control, and software are all rated approximately equal as top objectives for this sector. For details see Exhibit V-68.

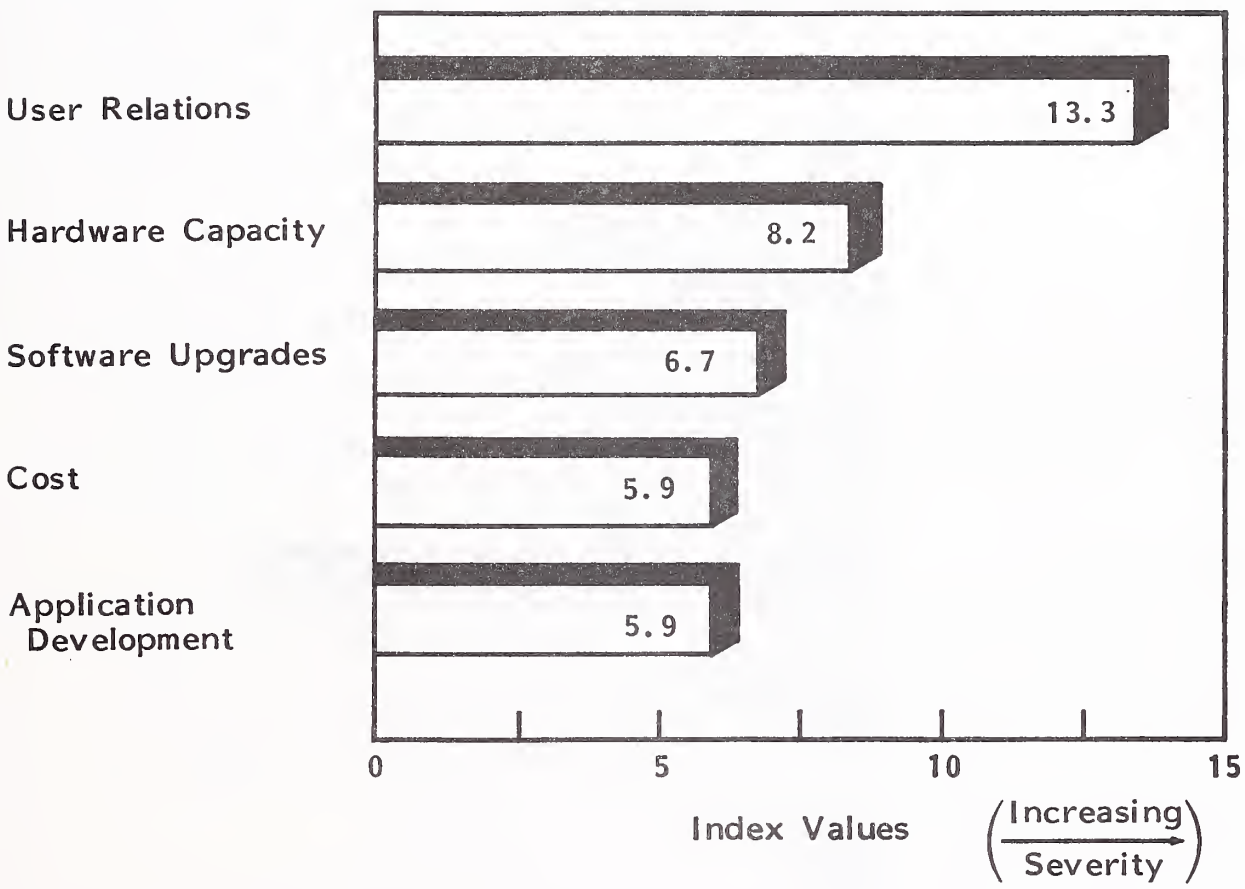
  - Hardware upgrades issues are the top hardware objectives.

  - Micro-mainframe interfaces comprise the most important end-user objectives.

- Corporate relations objectives, especially those dealing with supporting corporate objectives, and cost objectives are rated high. Personnel and telecommunications objectives are rated lowest.

EXHIBIT V-67

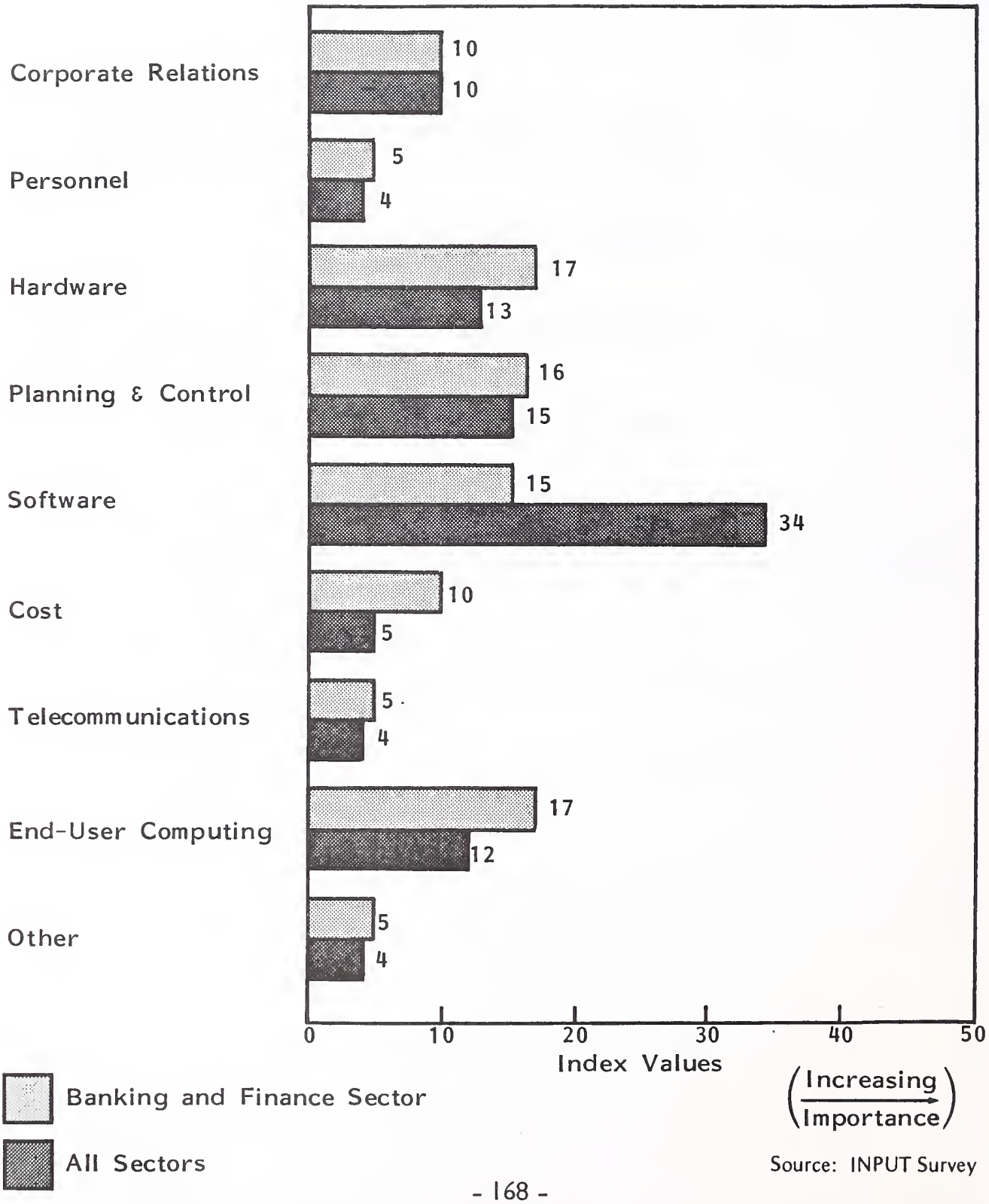
TOP FIVE INFORMATION SYSTEMS
PROBLEMS FOR THE BANKING AND FINANCE SECTOR
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-68

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE BANKING AND FINANCE SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Exhibit V-69 contains the top five objectives for this sector. These objectives are at the planning issue subgroup level of detail.

- Exhibit V-70 lists the issue groups in descending order of priority for objectives set by IS managers in this sector. These are compared to IS problems, senior management concerns, and the significance of the issue groups as an area of change in the next three years. The IS managers in this banking and finance industry view "other" issues, specifically exogenous factors and the AT&T divestiture, as very significant factors affecting IS in the next three years. These issues are the only high priority areas not adequately addressed by objectives.

3. APPLICATIONS

- Seventy-four percent of internally developed applications and 55% of externally developed applications are banking and finance industry specific. This is significantly above the average for all industries of 43% and 34% respectively. Banking and finance has the highest concentration of industry-specific applications for both internal and externally developed applications.

- Exhibits V-71 and V-72 show the top five internal and externally developed applications. Retail banking and general banking and finance applications are the top two applications for both internal and externally developed systems, by a significant margin over other top applications.

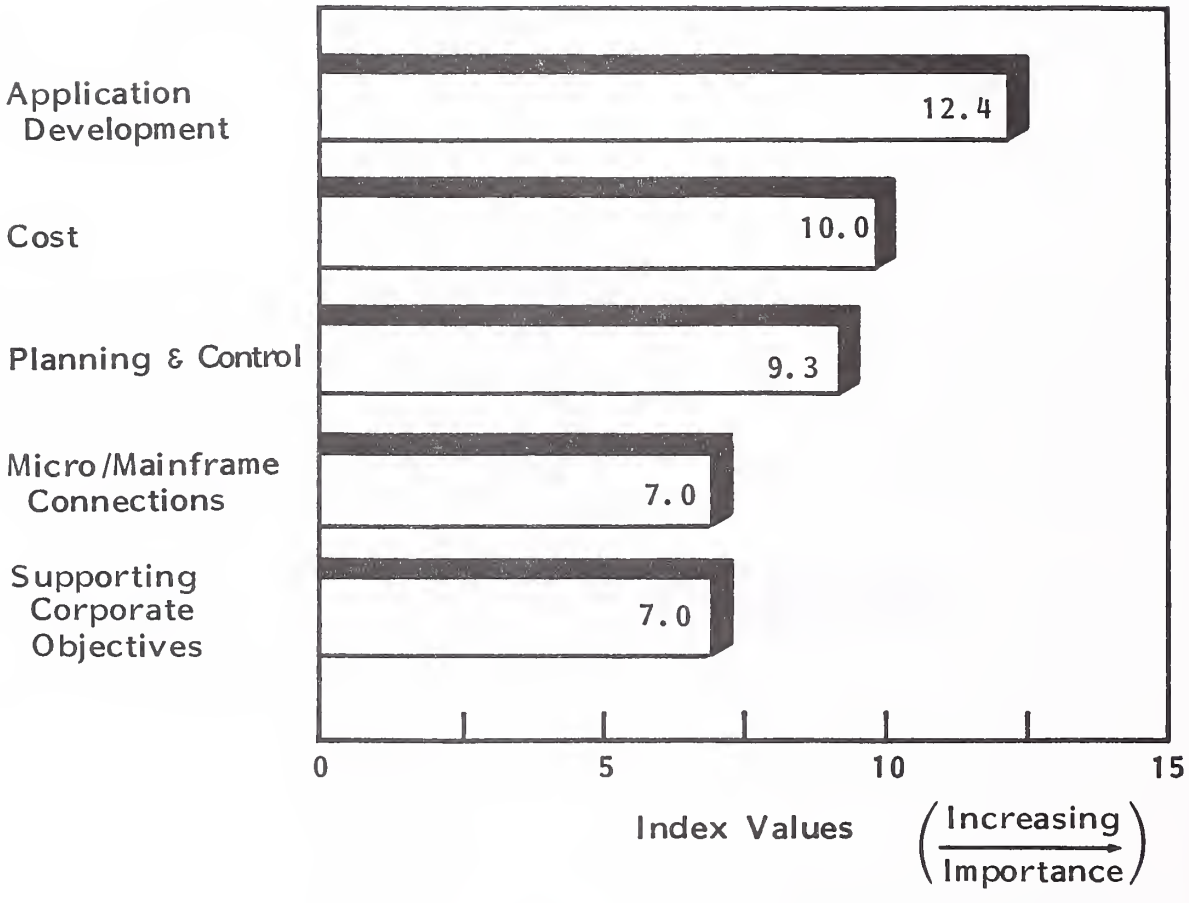
J. INSURANCE SECTOR

1. BUDGET ANALYSIS

- Eighty-seven percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Nine percent expect budgets to remain the same, and 4% expect decreases.

EXHIBIT V-69

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE BANKING AND FINANCE INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

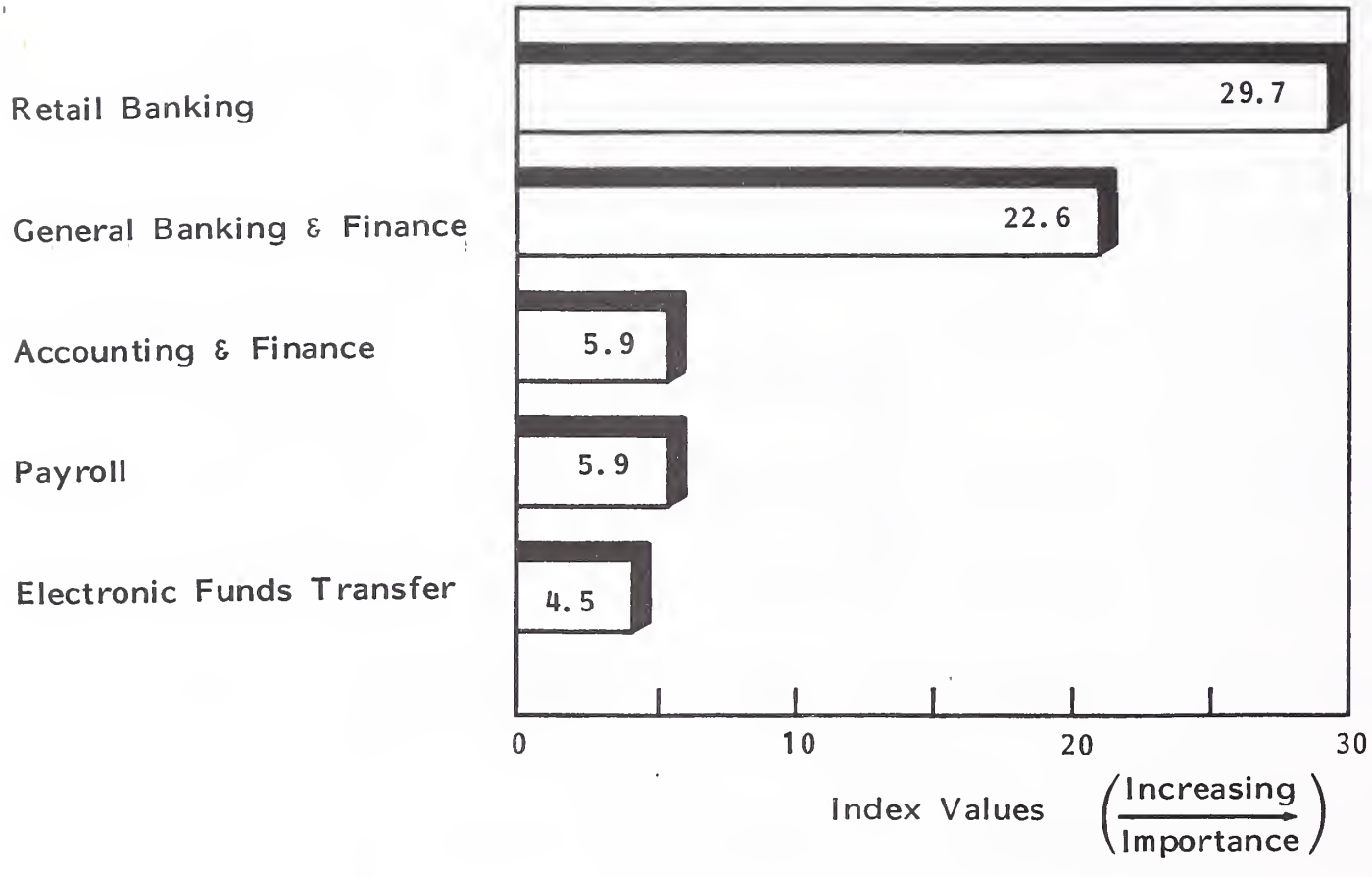
EXHIBIT V-70

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES
FOR THE BANKING AND FINANCE SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Hardware	Medium	Medium	Medium	Low
End-User Computing	Medium	Low	Low	Very High
Planning & Control	Medium	Medium	Medium	Low
Software	Medium	Medium	Low	Medium
Cost	Medium	Low	Very High	Low
Corporate Relations	Medium	Medium	Medium	Medium
Personnel	Low	Medium	Low	Low
Telecommunications	Low	Low	Low	Low
Other	Low	Medium	Medium	High

EXHIBIT V-71

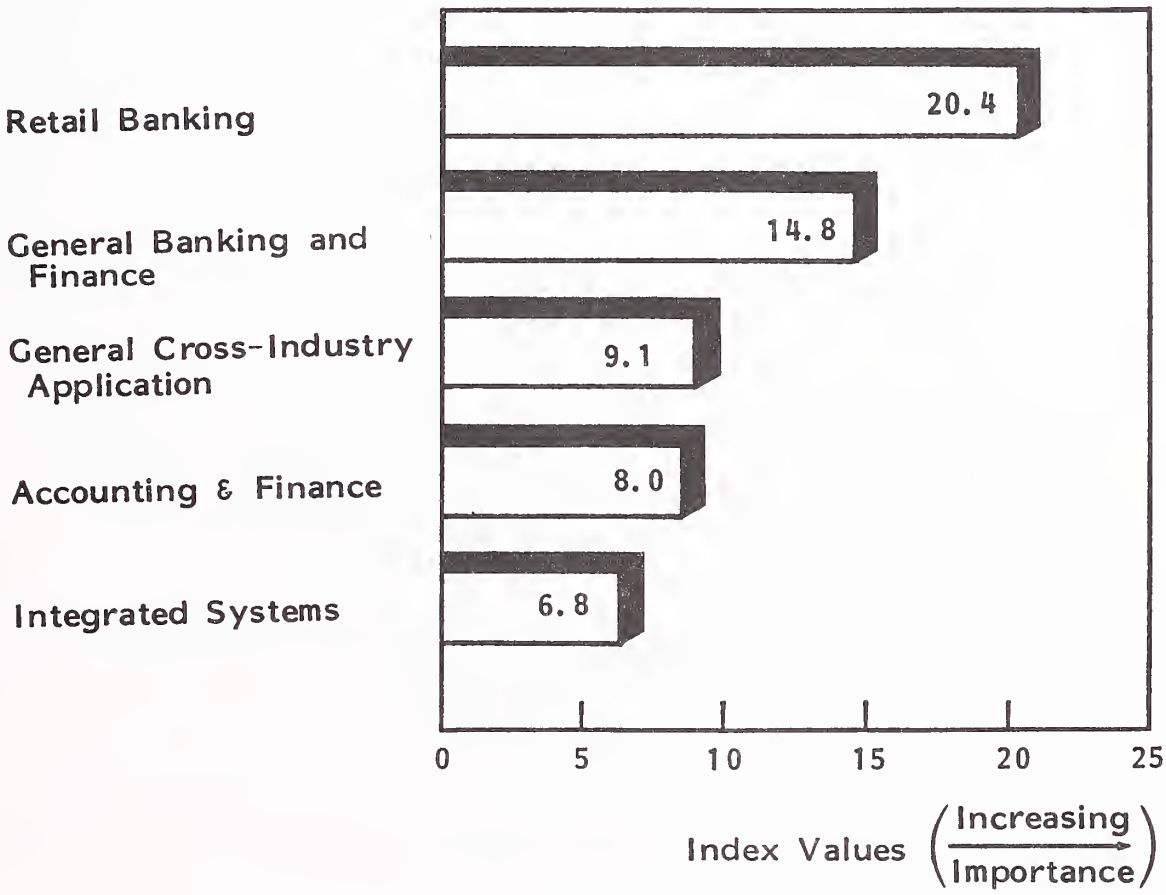
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE BANKING AND FINANCE INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-72

RELATIVE IMPORTANCE OF THE TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE BANKING AND FINANCE INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- The average budget growth expected in 1985 is 10%.
  - In 1984 budget growth was 8%.
  - The expected budget growth in 1985 for all industries is 11%.
- Exhibit V-73 shows the distribution of expenses in insurance information systems budgets.
- The insurance sector budget distribution is similar to the composite of all industries.
  - At 44%, personnel expenses dominate the budget.
  - Hardware expenses, at 23%, are the next largest, followed by software and communications, at 11% and 10% respectively.
- By far, the largest increases in expenditures expected in 1985 are for microcomputers and minicomputers, which should increase by 21% and 20% respectively.
  - These large projected growth figures mirror the importance this sector ascribes to end-user computing.
  - Hardware and software maintenance expenses are expected to increase significantly, by more than 12% combined.
- Custom programming expenses are planned to be slashed by more than 36%. This planned reduction reflects this sector's desire to minimize the use of contract programmers.

EXHIBIT V-73

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE INSURANCE SECTOR

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	43.7%	6.7%
Mainframe Processors	10.9	4.2
Minicomputers	2.1	20.4
Microcomputers	1.6	20.9
Mass Storage Devices	3.7	9.4
Terminals	2.4	(2.8)
Peripherals	2.0	(2.2)
Total Hardware	22.7%	5.9%
Communications	10.4	8.8
External Software	7.6	7.0
Custom Programming	2.6	(36.4)
Integrated Systems	0.3	0.0
Total Software	10.5%	(3.9)%
Software Maintenance	2.6	14.4
Hardware Maintenance	4.6	11.5
Total Maintenance	7.2%	12.5%
Outside Processing Services	0.8	0.0
Other	4.7	2.7
Total	100.0%	9.5%

- Information systems budgets as a percent of total insurance corporate revenue is 1.0%. This is slightly above the 0.8% average for all industries.

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Senior insurance executives' concerns about information systems issues parallel those of other industries, except that corporate relations is the most pressing concern and cost is the second most important concern, as shown in Exhibit V-74.

  - Senior management in this sector expressed significantly more interest in corporate relations issues than did management in other industries. This interest was focused on IS' role in achieving corporate objectives.

  - Insurance executives also were concerned with end-user computing, specifically office systems, more so than in other industries.

b. Problems

- Senior information systems management in the insurance sector see personnel issues as their predominant problem, as shown in Exhibit V-75. They rate it higher as a concern than does any other industry sector.

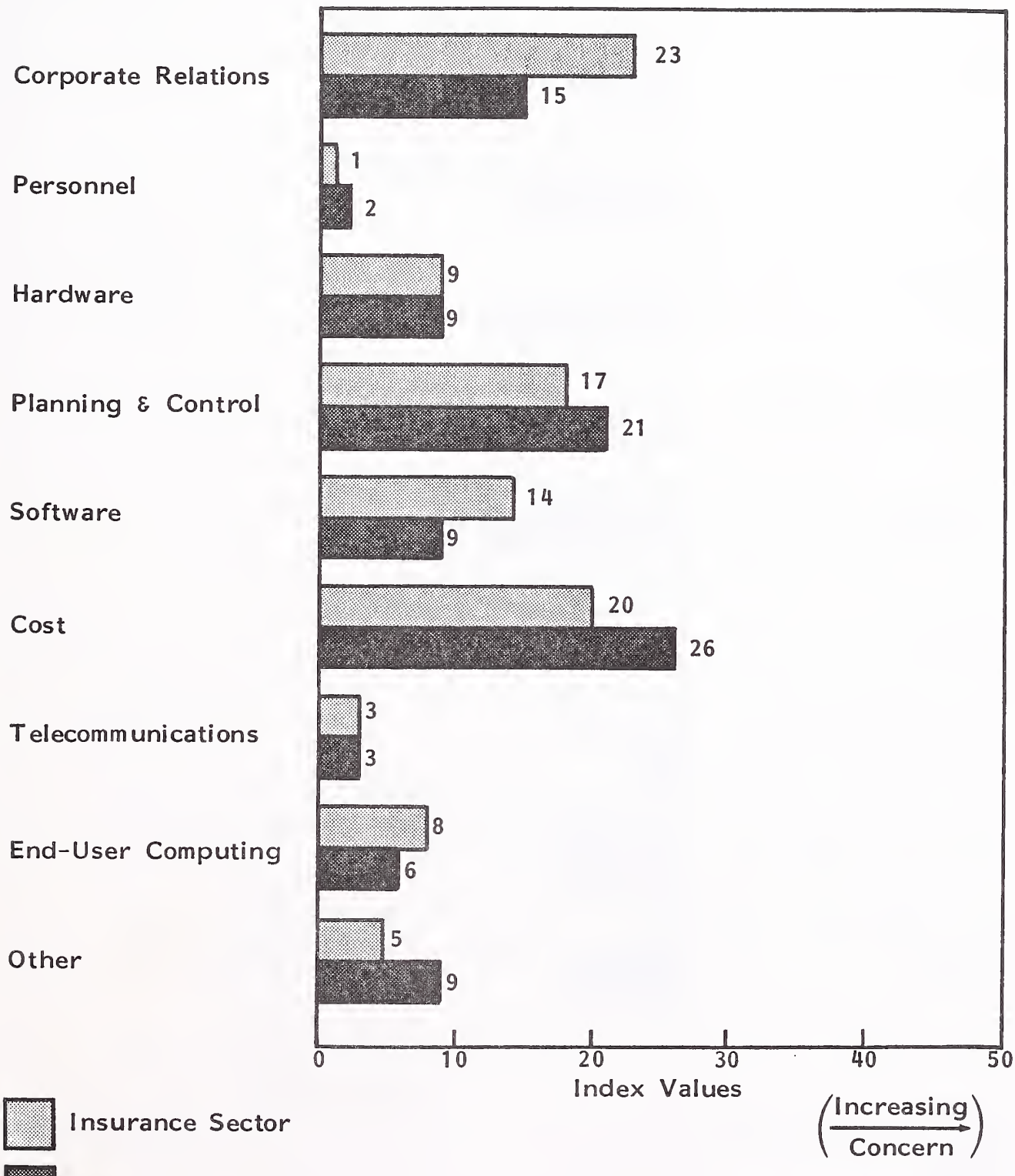
  - Personnel issues are over 40% more severe than the second most important problem, software.

  - Unfortunately, IS has assigned the lowest priority to objectives that address personnel issues.

  - Finding qualified personnel is the number one personnel problem.

EXHIBIT V-74

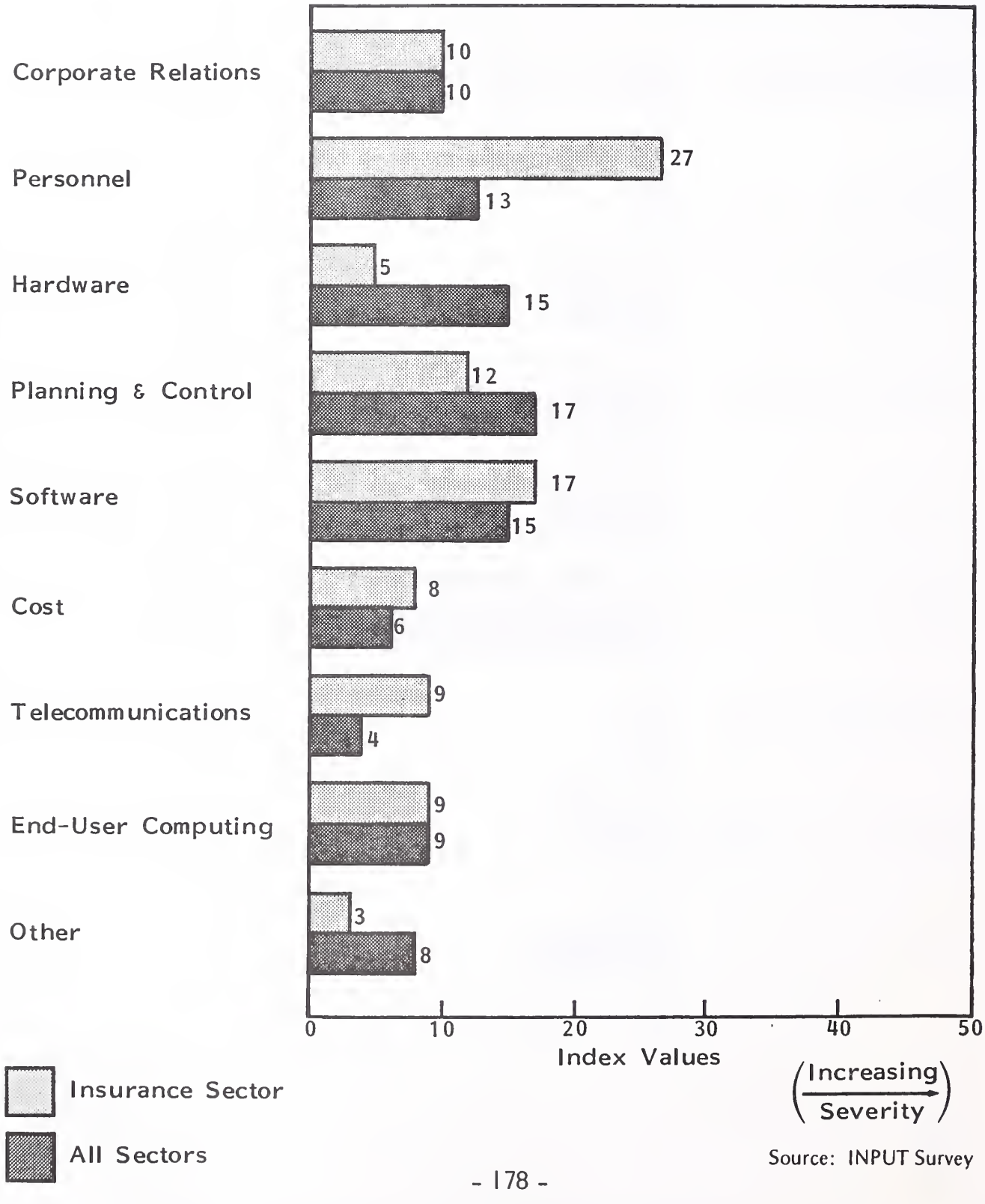
RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE INSURANCE SECTOR



Source: INPUT Survey

EXHIBIT V-75

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE INSURANCE SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- IS senior managers in the insurance sector have significantly more problems with telecommunications issues than do other industries; only the government and education sectors rated telecommunications problems higher.

- "Other" (exogenous) issues pose the least problem for the insurance industry.

- Exhibit V-76 shows the planning issue subgroups that were rated as top problems in this sector.

c. Objectives

- Accomplishment of software objectives is extremely important to insurance company IS managers; the next most important objectives, those dealing with end-user computing, are rated less than half as high, as shown in Exhibit V-77.

  - Accomplishment of software application development objectives is rated especially high.

  - Within the end-user computing category, managers express high interest in office systems, microcomputer acquisition, and information center related objectives.

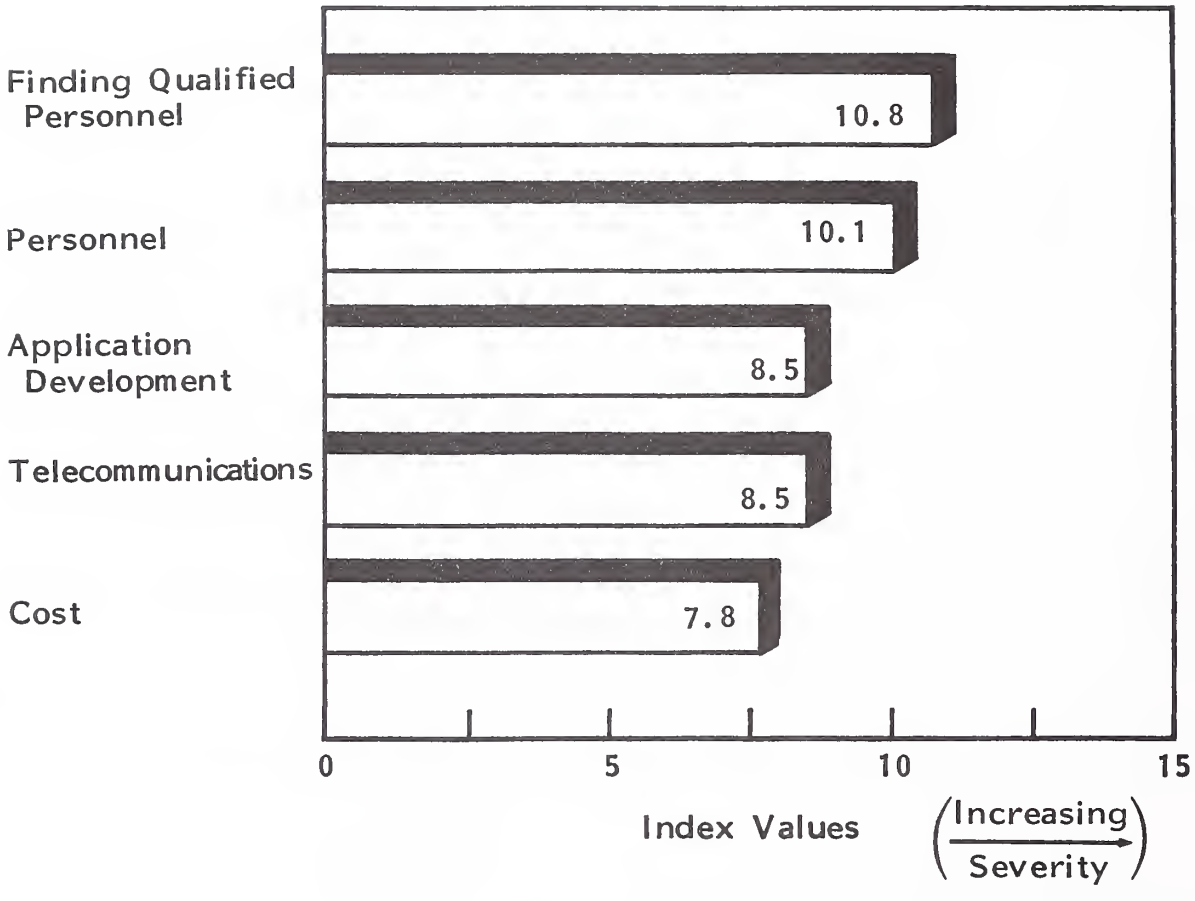
- Corporate relations objectives, especially those dealing with users, are also rated high.

- Personnel objectives are rated lowest even though personnel issues are viewed as this sector's most significant IS problem.

- Exhibit V-78 contains the top objectives for this sector. These objectives are at the planning issue subgroup level of detail.

EXHIBIT V-76

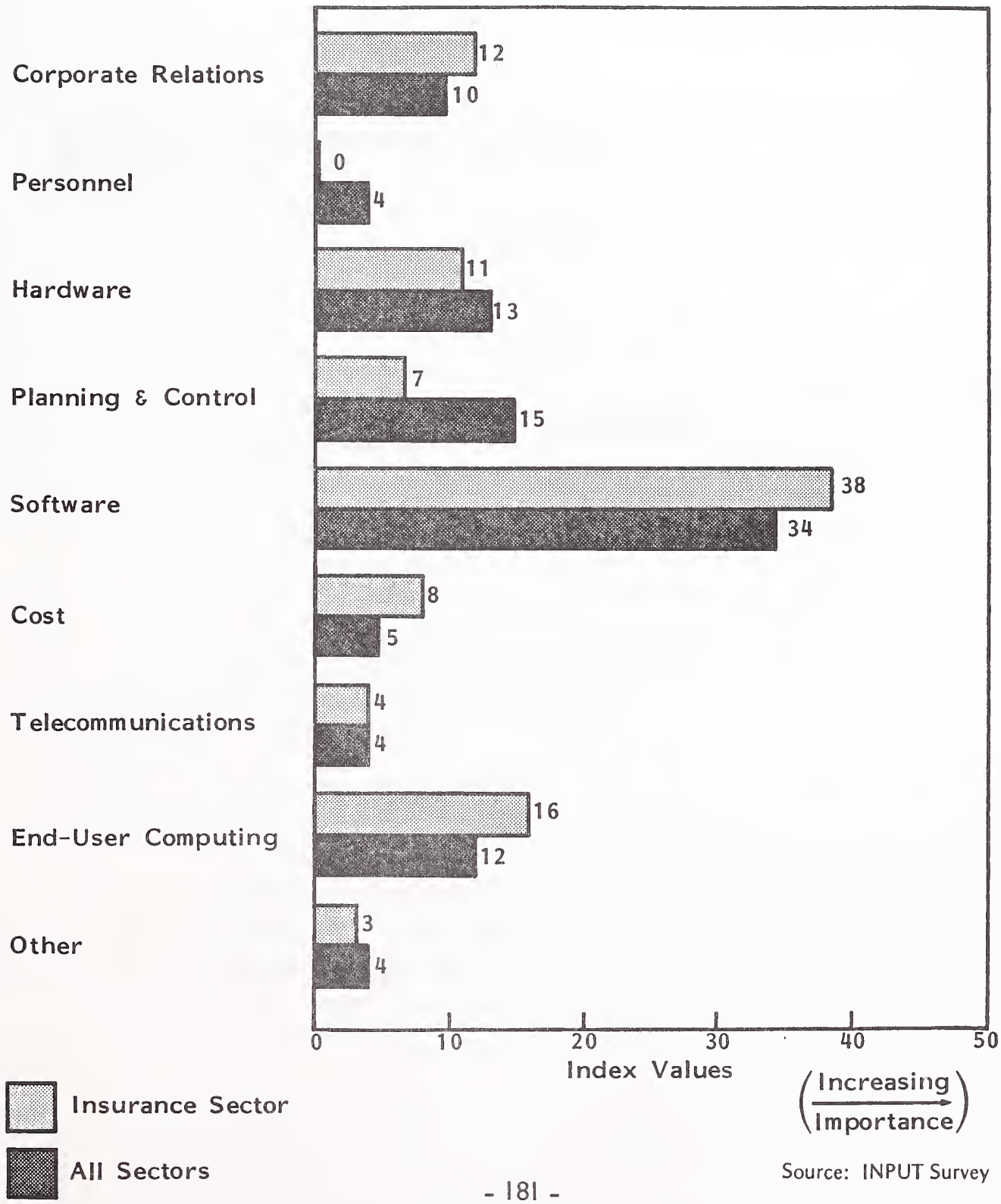
TOP FIVE INFORMATION SYSTEMS
PROBLEMS FOR THE INSURANCE SECTOR
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-77

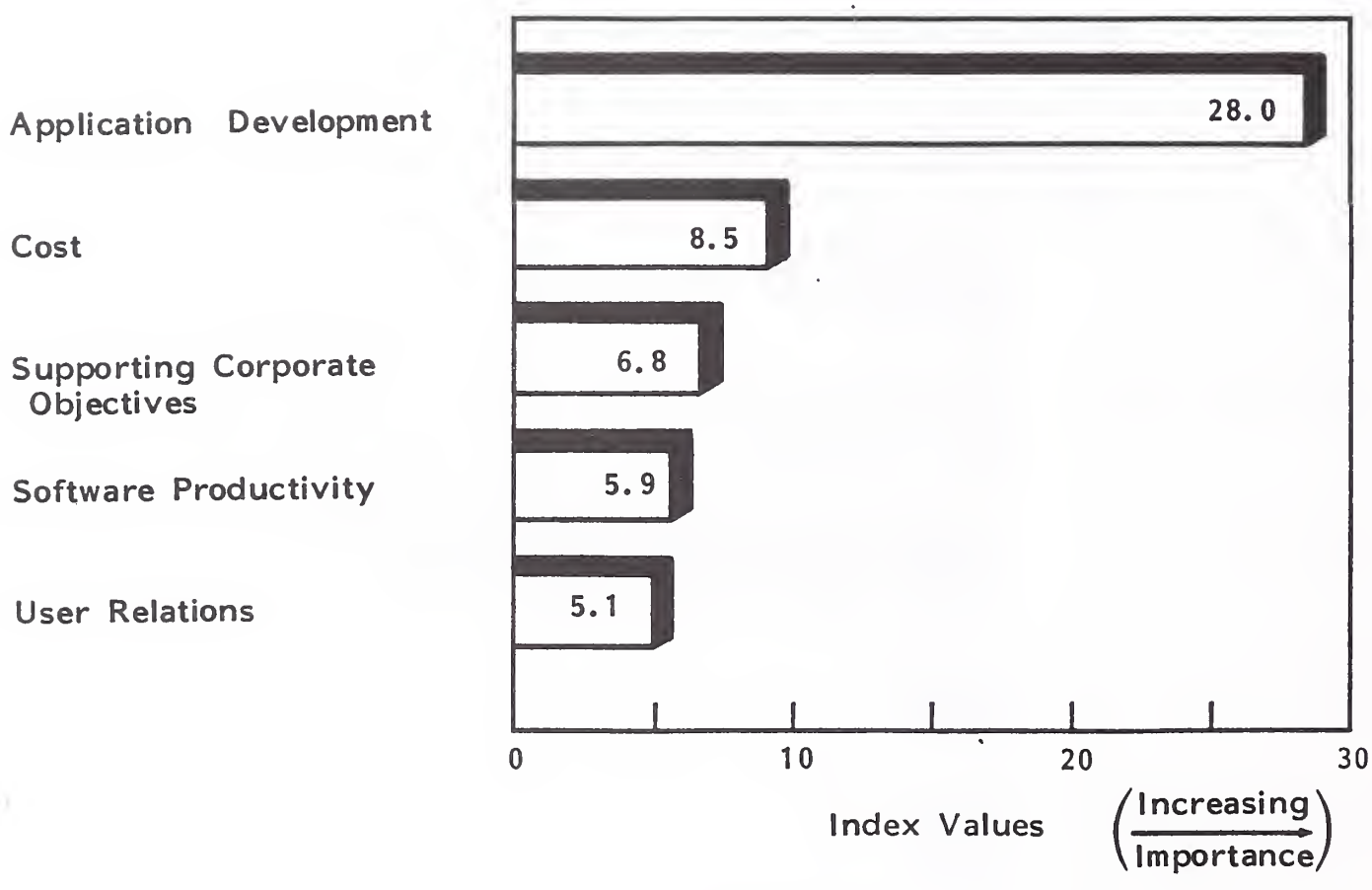
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE INSURANCE SECTOR (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-78

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE INSURANCE INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- Exhibit V-79 lists the issue groups in descending order of priority for objectives set by IS managers in the insurance sector. These are compared to the IS problems, senior management concerns, and the significance of the issues as an area of change in the next three years. The insurance IS managers do a relatively poor job of matching objectives to problems and areas of change. This is most dramatically shown by IS' assigning the lowest objective priority to their most significant problem, personnel issues.

3. APPLICATIONS

- Sixty-seven percent of internally developed applications and 52% of externally developed applications are insurance industry specific. This is significantly above the average for all industries of 43% and 34% respectively. The insurance sector has the second highest use of industry-specific applications for both internal and externally developed systems.

- Exhibits V-80 and V-81 show the top five internal and externally developed applications. General insurance and claims processing clearly dominate internally supported systems. General insurance applications are the highest ranked external system. These applications are almost three times as important as each of the second or third ranked systems (accounting and finance and integrated systems).

K. GOVERNMENT AND EDUCATION SECTORS

1. BUDGET ANALYSIS

- Sixty-four percent of the companies in this sector--compared with 87% from all industries--expect information systems budgets to increase in 1985. Eighteen percent expect budgets to remain the same, and 18% expect decreases.

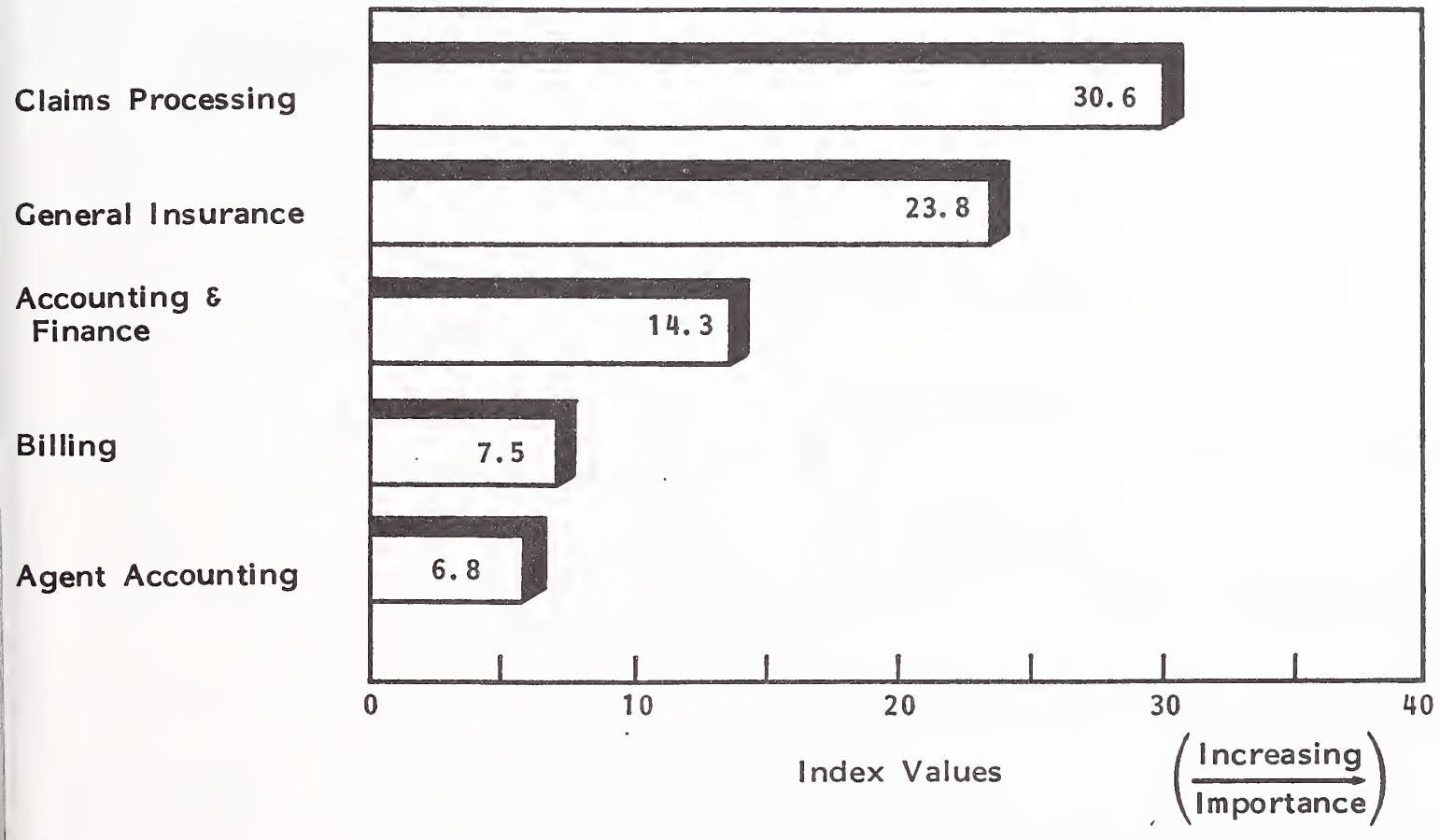
EXHIBIT V-79

OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES FOR THE INSURANCE SECTOR

ISSUE GROUP	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	Very High	Medium	Medium	Medium
End-User Computing	Medium	Low	Low	High
Corporate Relations	Medium	Medium	High	Medium
Hardware	Medium	Low	Low	Low
Cost	Low	Low	High	Low
Planning & Control	Low	Medium	Medium	Low
Telecommun-cations	Low	Low	Low	Low
Other	Low	Low	Low	High
Personnel	Low	High	Low	Low

EXHIBIT V-80

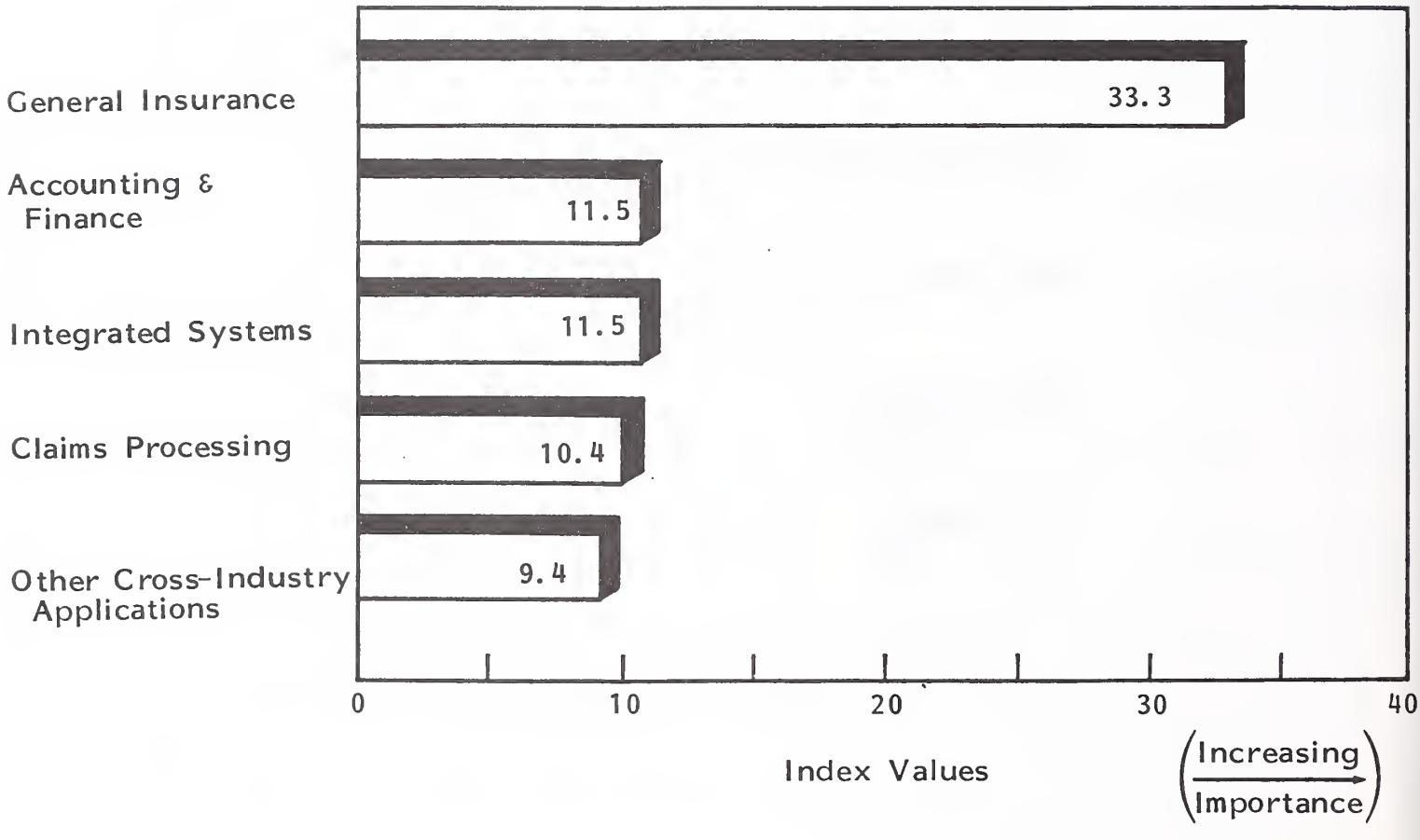
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE INSURANCE INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-81

RELATIVE IMPORTANCE OF TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE INSURANCE INDUSTRY (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

- The average budget growth expected in 1985 is 10%.
  - In 1984 budget growth was 9%.
  - The expected budget growth in 1985 for all industries is 11%.
- Exhibit V-82 shows the distribution of expenses in government and education information systems budgets.
- The government and education sectors budget breakdown closely parallels the average of all industries.
  - At 44%, personnel expenses dominate the budget.
  - Hardware expenses, at 25%, are the next largest, followed by communications at 13%.
- The largest increase in expenditures expected in 1985 is in minicomputer expense, which should increase by nearly 22%.
  - This is in contrast to the industry composite, where the biggest increase (18%) is in microcomputers.
  - Mass storage device and microcomputer expenses are also expected to increase significantly--about 11% each.
- Information systems budgets per education and government employee is only $759. This is significantly below the $1,060 average for all industries.

EXHIBIT V-82

1984 BUDGET DISTRIBUTION AND 1984/1985 CHANGES IN THE GOVERNMENT AND EDUCATION SECTORS

BUDGET CATEGORY	1984 PERCENT OF I.S. BUDGET	1984-1985 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	44.4%	3.5%
Mainframe Processors	7.7	4.7
Minicomputers	9.0	21.9
Microcomputers	3.8	10.9
Mass Storage Devices	1.8	11.2
Terminals	2.3	0.3
Peripherals	0.8	(1.6)
Total Hardware	25.4%	5.9%
Communications	12.6	NM
External Software	7.8	7.0
Custom Programming	0.2	0.0
Integrated Systems	NM	NM
Total Software	8.0%	6.8%
Software Maintenance	3.5	7.7
Hardware Maintenance	6.1	4.8
Total Maintenance	9.7%	5.8%
Outside Processing Services	NM	NM
Other	NM	NM
Total	100.0%	10.0%

NM = No Meaningful Data

2. INFORMATION SYSTEMS PLANNING ISSUES

a. Senior Management Concerns

- Concern about information systems issues expressed by senior government and education executives is different from that of other industries, as shown in Exhibit V-83.

  - End-user computing is the most significant concern.

  - Cost, which dominates senior managers' concerns in other sectors, is considered the third most important issue (along with planning and control) to government and education executives.

b. Problems

- Senior information systems managers in the government and education sectors see end-user computing as their number one problem, as shown in Exhibit V-84. They rate it higher as a concern than does any other industry sector.

- Telecommunications issues are rated nearly as high as end-user computing. The education sector is especially concerned with telecommunications.

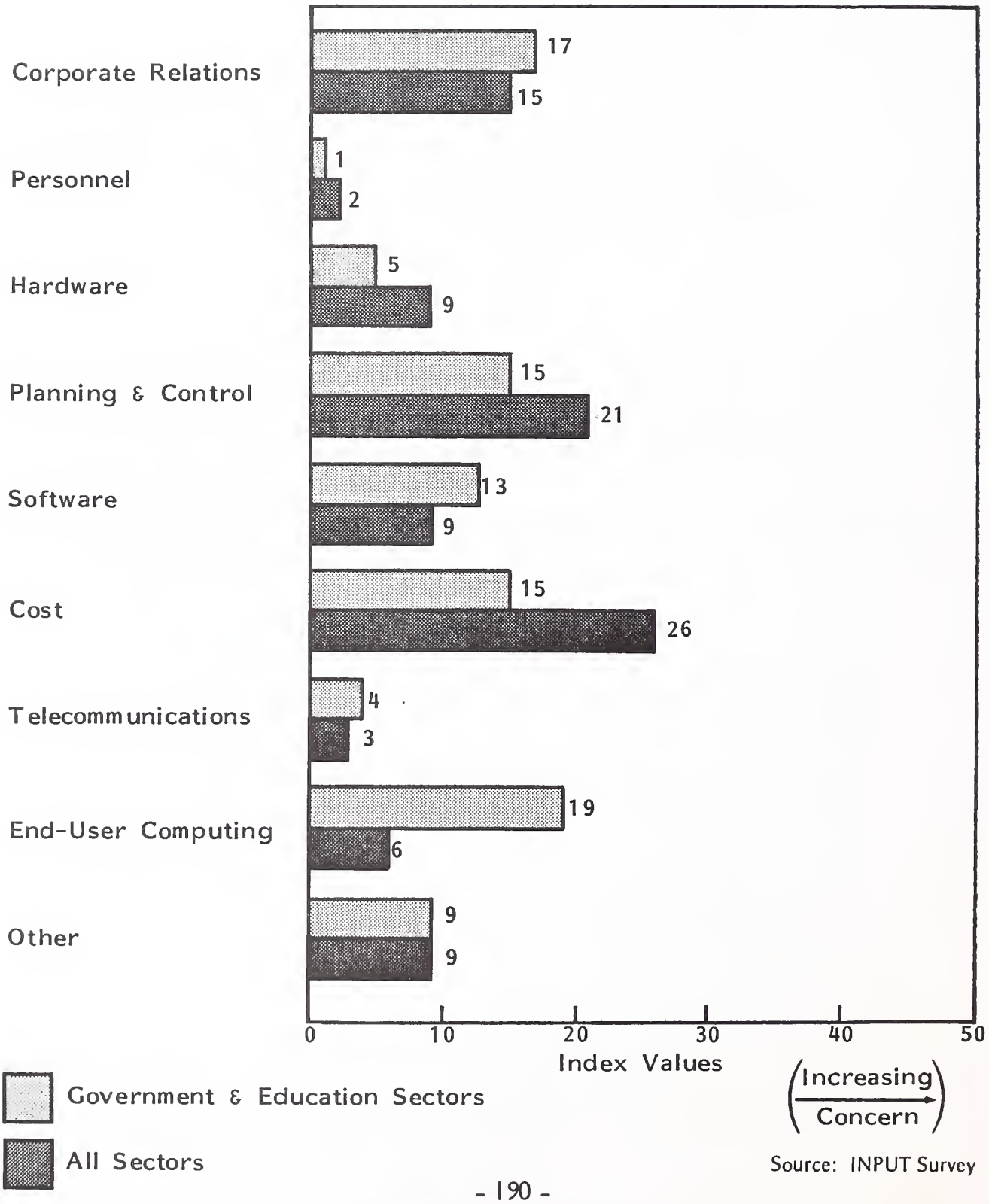
- Planning and control and hardware issues are considered less severe as problems to managers in these sectors than in other sectors.

- "Other" issues (exogenous factors) pose the least problem to the government and education sectors.

- Exhibit V-85 shows the planning issue subgroups that were rated as top problems in this sector.

EXHIBIT V-83

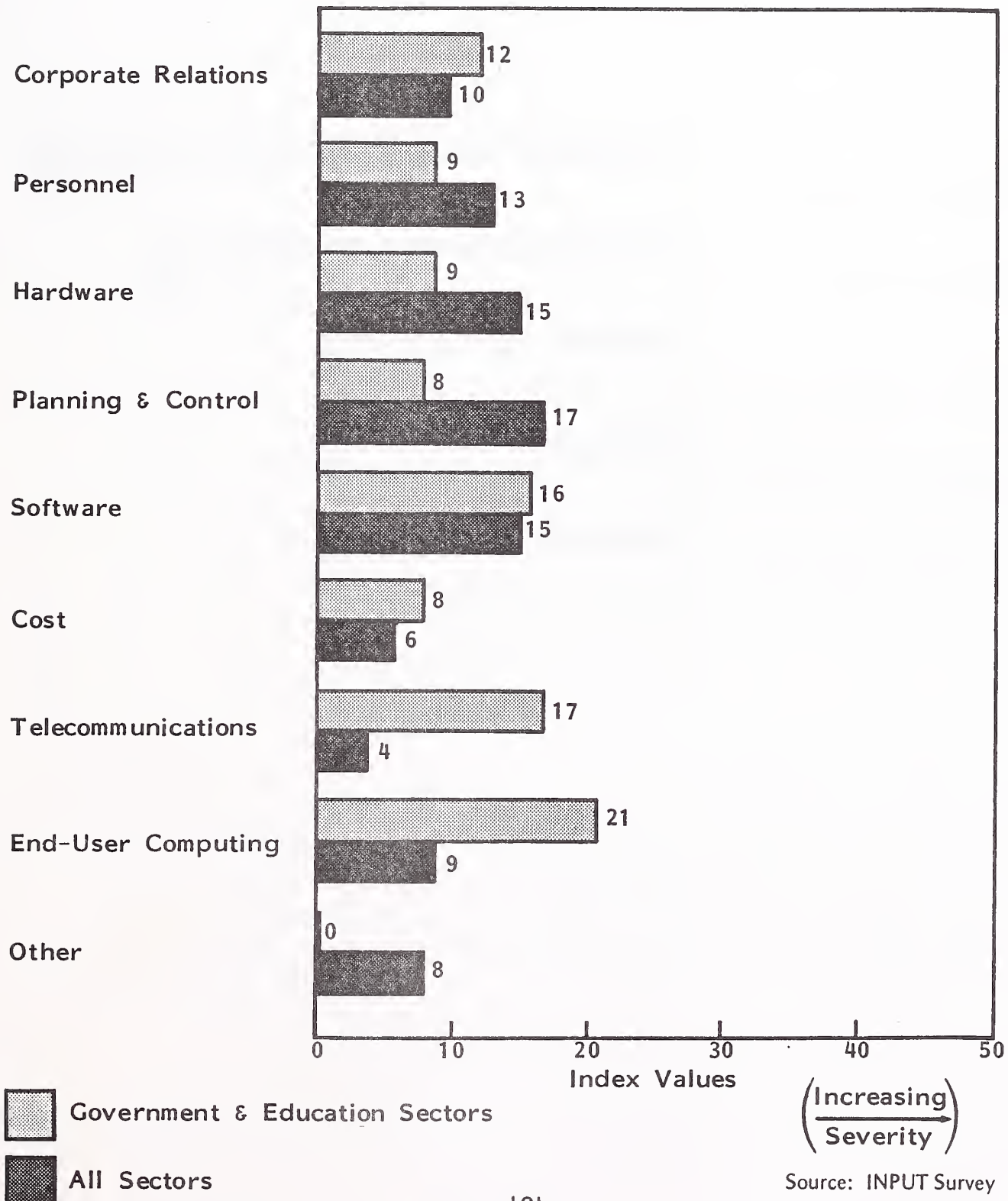
RELATIVE IMPORTANCE OF SENIOR MANAGEMENT CONCERNS IN THE GOVERNMENT AND EDUCATION SECTORS



Source: INPUT Survey

EXHIBIT V-84

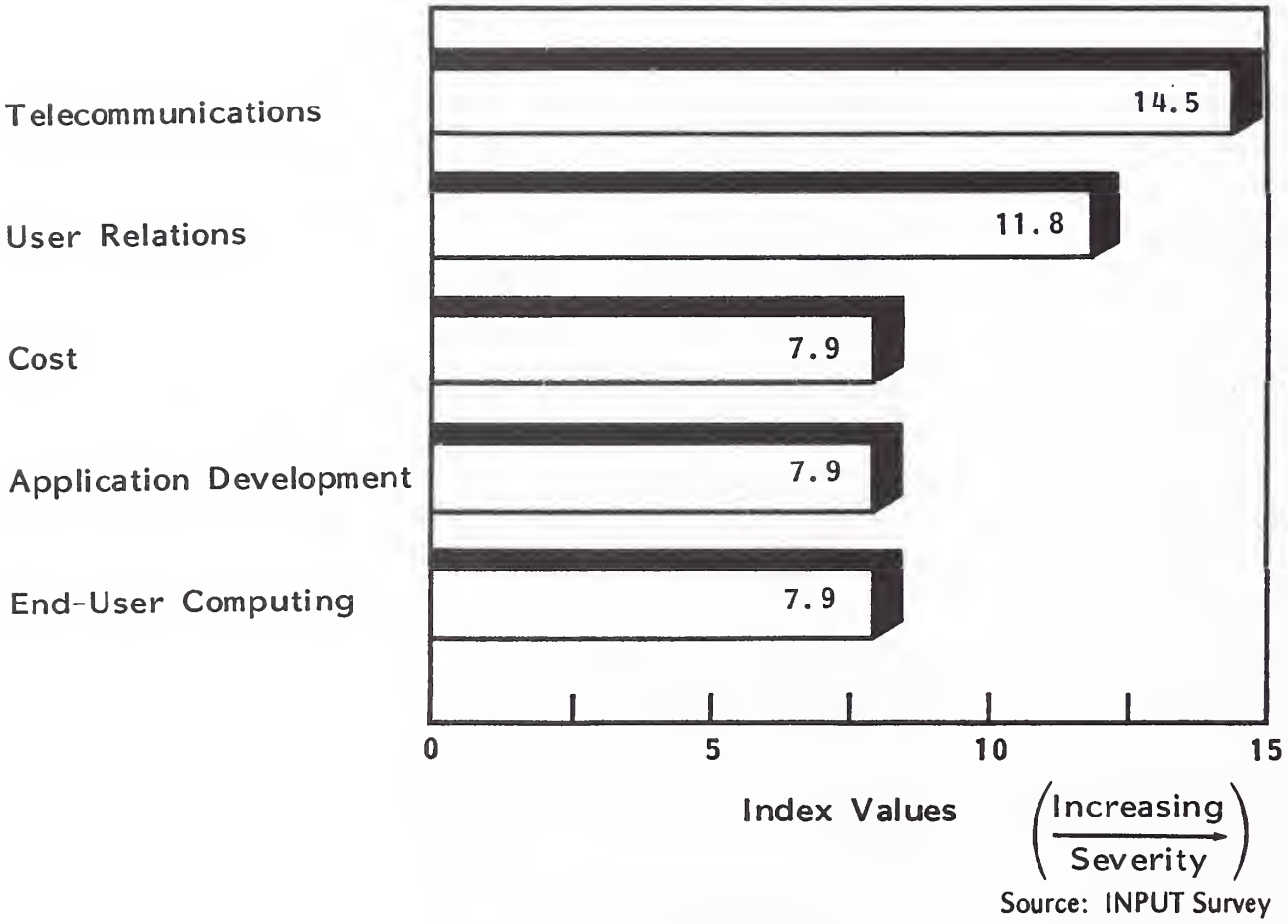
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS IN THE GOVERNMENT AND EDUCATION SECTORS (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-85

TOP FIVE INFORMATION SYSTEMS
PROBLEMS FOR THE GOVERNMENT AND EDUCATION SECTORS
(IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

c. Objectives

- Accomplishment of software objectives is extremely important to these sectors' IS managers, as shown in Exhibit V-86.

  - Accomplishment of software applications objectives is rated especially high.

  - General planning and control issues were also important as objectives.

- Corporate relations objectives, especially those dealing with users, are also rated high.

- Exhibit V-87 contains the top objectives for this sector. These objectives are at the planning issue subgroup level of detail.

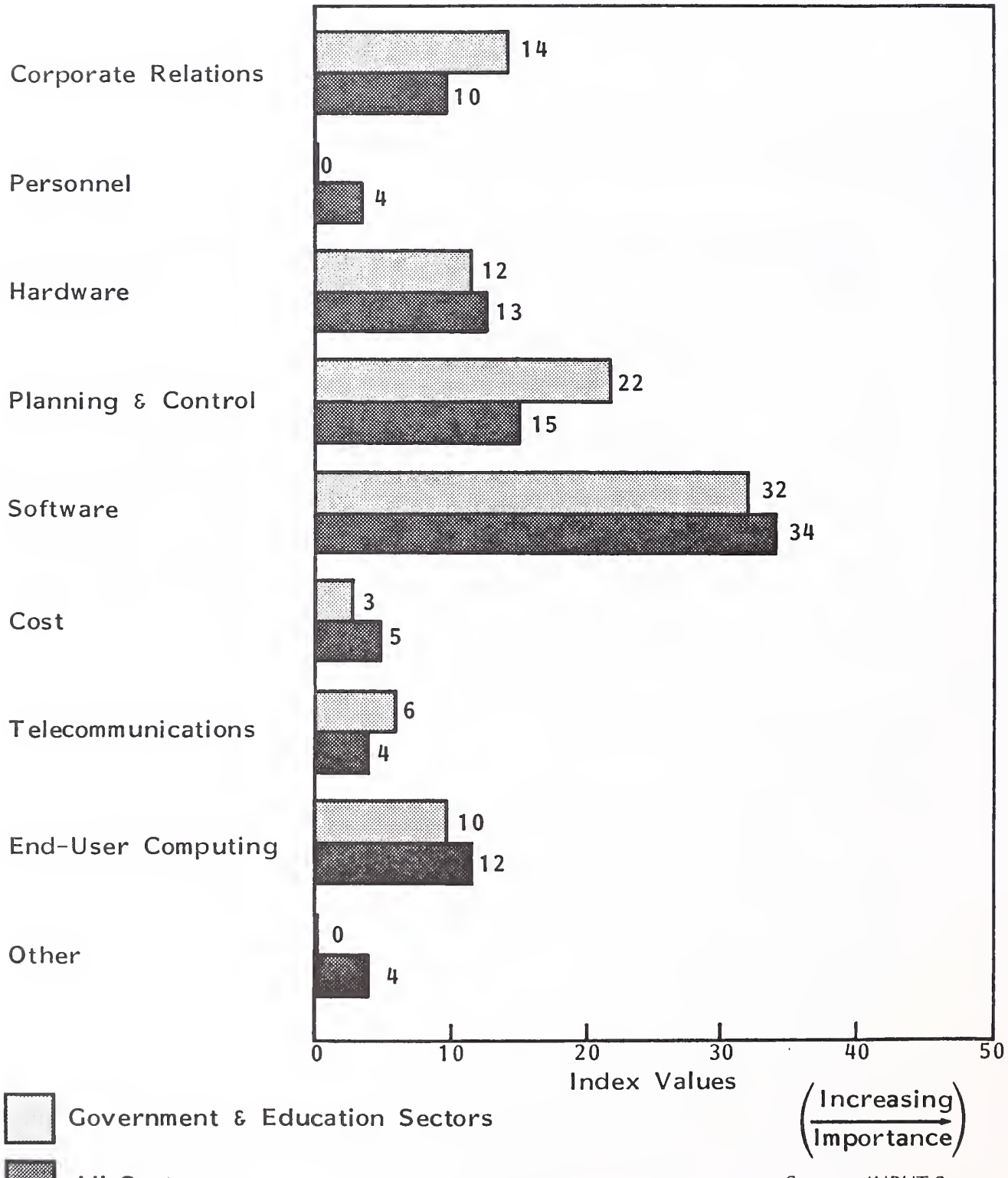
- Exhibit V-88 lists the issue groups in descending order of priority for objectives set by IS managers in government and education. These are compared to IS problems, senior management concerns, and the significance of the issues as an area of change in the next three years. The IS managers in these sectors do an average job of matching objectives to problems and area of change, with the exception of planning and control. This issue is a high-priority objective but is viewed as being of low importance, both as an IS problem and as a factor for changing IS departments.

3. APPLICATIONS

- Forty-two percent of internally developed applications and 51% of externally developed applications are government and education industry specific. The first figure is about the same as for all industries (43%). Externally developed applications are significantly higher for this industry than the all-industry average of 34%, however.

EXHIBIT V-86

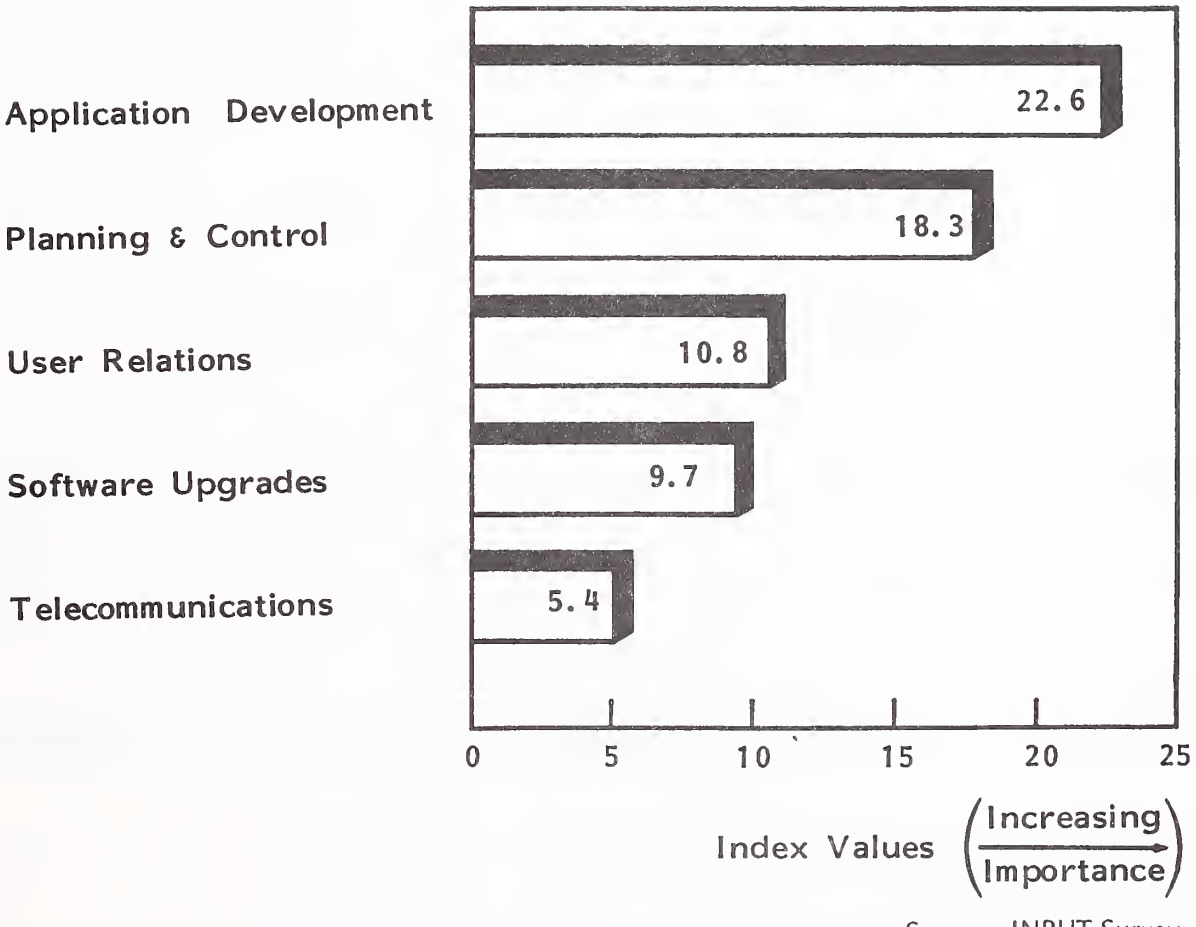
RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES IN THE GOVERNMENT AND EDUCATION SECTORS (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-87

TOP FIVE INFORMATION SYSTEMS OBJECTIVES FOR THE GOVERNMENT AND EDUCATION INDUSTRIES (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-88

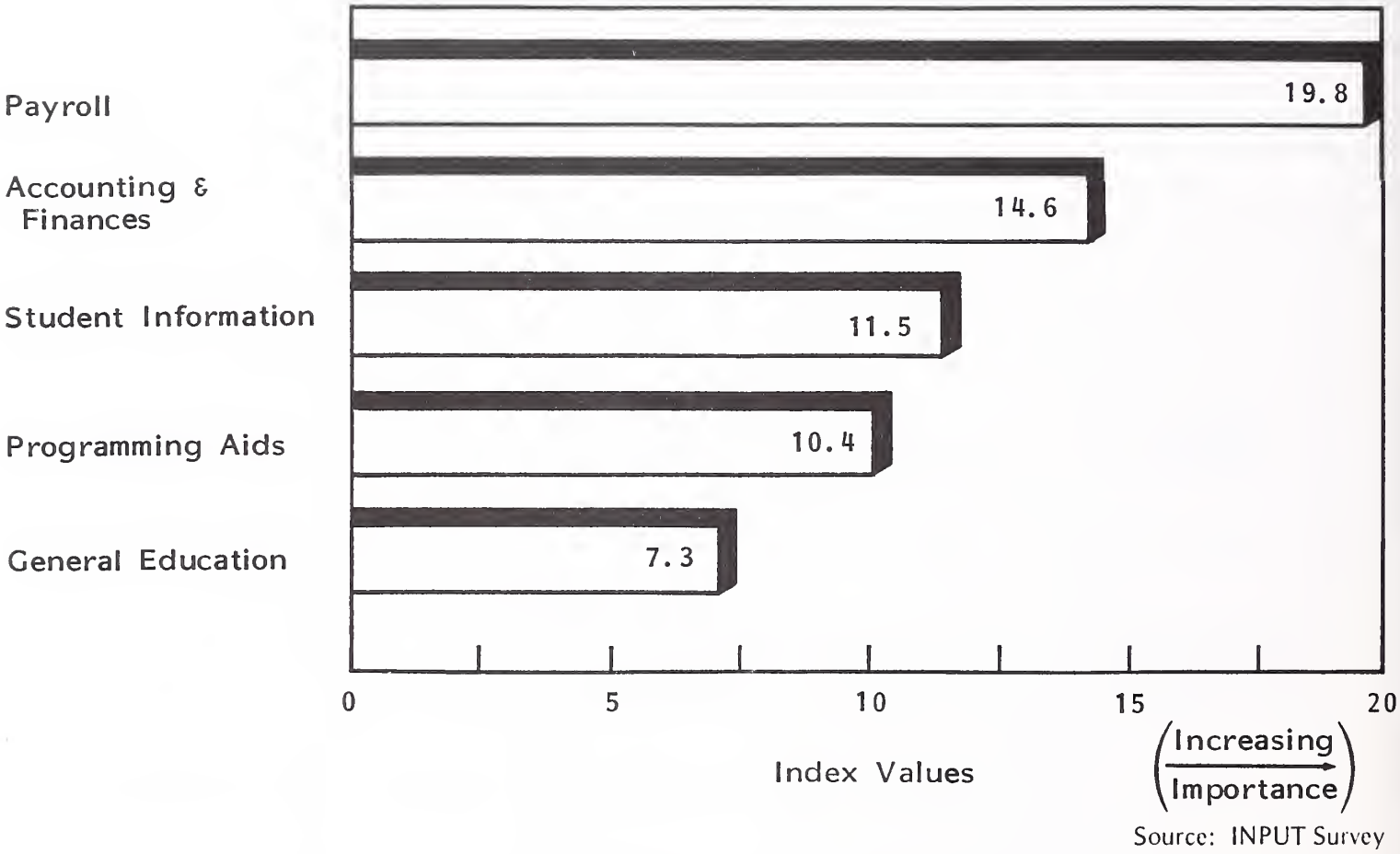
OBJECTIVES VERSUS PROBLEMS, CONCERNS, AND CHANGES FOR THE GOVERNMENT AND EDUCATION SECTORS

	I.S. OBJECTIVES PRIORITY	I.S. PROBLEMS IMPORTANCE	SENIOR MANAGEMENT CONCERNS	CHANGES AFFECTING I.S. SIGNIFICANCE
Software	Very High	Medium	Medium	Low
Planning & Control	High	Low	Medium	Low
Corporate Relations	Medium	Medium	Medium	High
Hardware	Medium	Low	Low	Medium
End-User Computing	Medium	High	Medium	Very High
Telecommunications	Low	Medium	Low	Low
Cost	Low	Low	Medium	Low
Personnel	Low	Low	Low	Low
Other	Low	Low	Low	Low

- Exhibit V-89 and V-90 show the top internally and externally developed applications.

EXHIBIT V-89

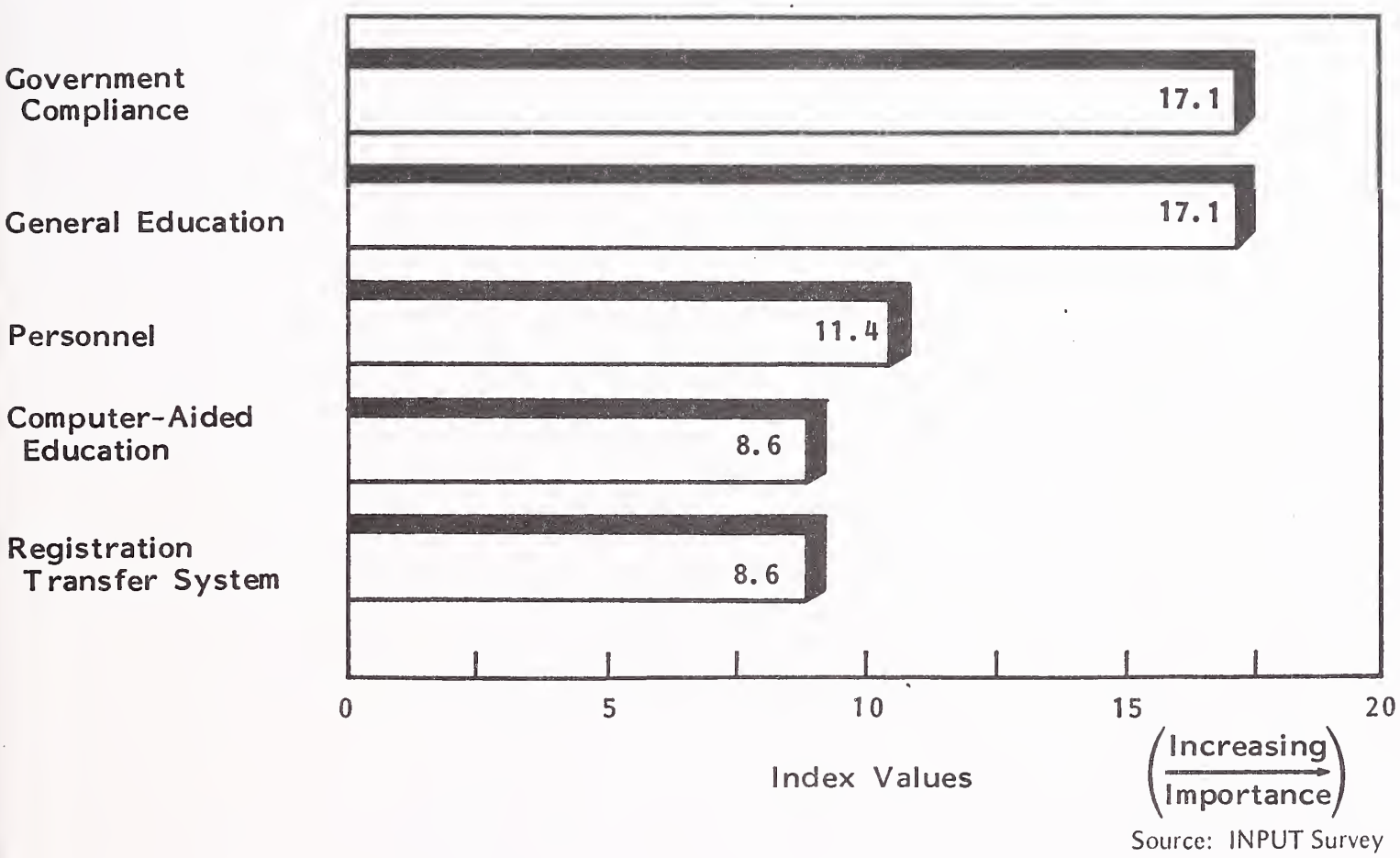
RELATIVE IMPORTANCE OF TOP FIVE INTERNALLY DEVELOPED APPLICATIONS FOR THE GOVERNMENT AND EDUCATION INDUSTRIES (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

EXHIBIT V-90

RELATIVE IMPORTANCE OF TOP FIVE EXTERNALLY DEVELOPED APPLICATIONS FOR THE GOVERNMENT AND EDUCATION INDUSTRIES (IMPORTANCE TO I.S. MANAGERS)



Source: INPUT Survey

APPENDIX A: PROFILE OF INTERVIEWED ORGANIZATIONS

APPENDIX A

PROFILE OF INTERVIEWED ORGANIZATIONS
(Number of Respondents)

Data for the 1984 Annual Report Was Obtained from 256 Responding Organizations Distributed as Follows

SECTOR	UNDER $250 MILLION	$251 MILLION TO $1 BILLION	OVER $1 BILLION	TOTAL
DISCRETE MANUFACTURING	16	11	11	38
PROCESS MANUFACTURING	9	6	18	33
TRANSPORTATION	3	5	6	14
MEDICAL	15	1	0	16
SERVICES	16	5	3	24
UTILITIES	4	8	9	21
DISTRIBUTION	17	11	8	36
BANKING AND FINANCE	3	6	19	28
INSURANCE	6	7	13	26
GOVERNMENT & EDUCATION	9	8	1	18
OTHER	0	1	1	2
TOTAL	98	69	89	256

APPENDIX B: QUESTIONNAIRE

INPUT's 1984 INFORMATION SYSTEMS EXECUTIVE PANEL

1. Total 1984 Information Systems (IS) Budget _____ (15) ($000). Anticipated changes in 1985 _____ (16) %.

BUDGET DETAIL

CATEGORIES	1984 I.S. BUDGET Amount ($000)	ANTICIPATED PERCENT CHANGE IN 1985
PERSONNEL		
Personnel salaries	(17) $	% (54)
Benefits	(18) $	% (55)
Total Personnel	(19) $	% (56)
HARDWARE EXPENSE		
Mainframe processors	(27) $	% (64)
Minicomputers	(28) $	% (65)
Personal computers	(29) $	% (66)
Mass storage devices	(30) $	% (67)
Terminals	(31) $	% (68)
Other peripherals	(32) $	% (69)
Subtotal Hardware	(33) $	% (70)
Maintenance	(34) $	% (71)
Total Hardware	(35) $	% (72)
COMMUNICATIONS		
Data Communications		
Hardware & Software	(36) $	% (73)
Line costs	(40) $	% (77)
Voice communication (only if IS is responsible)	(41) $	% (78)
Total Communications	(42) $	% (79)
SOFTWARE		
External software products – purchase	(43) $	% (80)
External software – rent/lease	(44) $	% (81)
Software maintenance	(45) $	% (82)
Total Software	(46) $	% (83)
Custom programming	(47) $	% (84)
Integrated systems – purchase	(48) $	% (85)
Integrated systems – rent/lease	(49) $	% (86)
Outside processing services	(50) $	% (87)
Other – please specify (including corporate overhead charges, if any) (51)	(52) $	% (88)
TOTAL	(53) $	% (89)

over

2. What was your IS budget in 1982? _____ (90) ($000), 1983? _____ (91) ($000)

3. Is the above IS budget for:

(92) ☐ Entire company? (go to question no. 7)

☐ Division or subsidiary?

4. What is your company's total 1984 IS budget? _____ ($000) (93)

What do you anticipate its change will be in 1985? _____ % (94)

5. What is your entire company's revenue in 1984? $_____ (95) million.

What is the revenue of your subsidiary/division (if applicable)? $_____ (96) million.

Code

6. What is your subsidiary/division's primary business sector, if different from your parent company's? _____ ☐☐ (97)

7. IS staff:

What was your total IS staff:	1982	1983	1984 (budgeted)	1985 (est.)	1988 (est.)
TOTAL	(98)	(104)	(110)	(116)	(122)
Programmer/Analyst	(99)	(105)	(111)	(117)	(123)
Management	(100)	(106)	(112)	(118)	(124)
Other professionals (specify)	(101)	(107)	(113)	(119)	(125)
Clerical	(102)	(108)	(114)	(120)	(126)
Other (specify)	(103)	(109)	(115)	(121)	(127)

8. a. Which are the most important computer system applications being supported in your company, in order of importance?

Code

_____ (128) 1. _____ (129)

_____ (130) 2. _____ (131)

_____ (132) 3. _____ (133)

b. Which applications do you spend the most money on to outside companies (e.g., software packages, timesharing services, and custom programming)?

Code		Application	Vendor	1983 Spending	1984 Spending
_____ (134)	1.	_____ (135)	_____ (136)	$ _____ (137)	$ _____ (138)
_____ (139)	2.	_____ (140)	_____ (141)	$ _____ (142)	$ _____ (143)
_____ (144)	3.	_____ (145)	_____ (146)	$ _____ (147)	$ _____ (148)

over

Questions 9 & 10

* Choose one characteristic that best describes the software or procedure in the application:

a. Spreadsheet
b. File management
c. Program development
d. Text processing
e. Graphics
f. Transaction processing package
g. Analytical processing package
h. Reporting
i. Communications
j. Other (Describe for each)

9. What are the most important applications being supported in your company for use on personal computers? (In order of importance, where importance = $ spent.)

Code		Application	Vendor	Characteristic*	1983 SW Spending	1984 SW Spending
(149)	a.	(150)	(151)	(152)	$ (153)	$ (154)
(155)	b.	(156)	(157)	(158)	$ (159)	$ (160)
(161)	c.	(162)	(163)	(164)	$ (165)	$ (166)

10. Are there any new Personal Computer applications that you expect will be installed in your company this year? (In order of importance.)

Code		Application	Vendor	Characteristic*	Expected SW Spending
(167)	a.	(168)	(169)	(170)	$ (171)
(172)	b.	(173)	(174)	(175)	$ (176)
(177)	c.	(178)	(179)	(180)	$ (181)

12. How many members of the IS staff support PCs in your organization? _____ (194)

How many perform the following functions:

PC software development _____ (195)
Training _____ (196)
Other support _____ (197)
Other PC-related tasks (please specify) _____ (198) _____ (199)

13. What is your best estimate of the number of non-IS people supporting PCs in your company? _____ (200)

over (end of UUAR84A)

(Start UUAR84B)

14. How many personal computers were in your company in:

    1982 _____ (1)

    1983 _____ (2)

    1984 _____ (3)

    1987 (est.) _____ (4)

15. What do you consider to be your top three problems confronting IS during the next 12 months (with "1" being the most serious)?

Code

_____ (5) 1. _____ (6)

_____ (7) 2. _____ (8)

_____ (9) 3. _____ (10)

16. What are your top three objectives to be accomplished in the next 12 months?

Code

_____ (11) 1. _____ (12)

_____ (13) 2. _____ (14)

_____ (15) 3. _____ (16)

Code 17. What will be the most significant change affecting the IS department in the next three years?

_____ (17) _____ (18)

_____ (19) _____ (20)

_____ (21) _____ (22)

Code 18. What exogenous factors (outside IS's direct control) concern you the most?

_____ (23) _____ (24)

_____ (25) _____ (26)

_____ (27) _____ (28)

19. What is senior management's top three concerns regarding information systems and telecommunications? (with "1" being the most serious)?

Code

_____ (29) 1. _____ (30)

_____ (31) 2. _____ (32)

_____ (33) 3. _____ (34)

over

20. Who in your organization would be best to interview regarding?

Mainframe Software

Name _____ (42) Title _____ (43) Phone (___) _____ (44)

Address _____ (45) City _____ (46) State (47) Zip _____ (48)

Telecommunications

Name _____ (56) Title _____ (57) Phone (___) _____ (58)

Address _____ (59) City _____ (60) State (61) Zip _____ (62)

(They will be sent questionnaires for their written responses.)

THANK YOU

Name _____ (63) Title _____ (64) Phone (___) _____ (65)

Company _____ (66) Revenue/Assets $_____ MM (67)

Number of Employees _____ (68) Industry Sector _____ (69)

APPENDIX C: RELATED INPUT REPORTS

APPENDIX C: RELATED INPUT REPORTS

- End-User Micro-Mainframe Needs, July 1984.

  - Describes experiences of organizations that use micro-mainframe linkages and systems. This report also identifies systems requirements and projects future effects of the micro-mainframe phenomena.

- Micro-Mainframe: Communications Issues, July 1984.

  - Analyzes, in detail, microcomputer communications modes, their advantages and limitations, and how these communications are likely to change in the next two to three years.

- Large-Scale System Directions: Mid-Year Update, July 1984.

  - Identifies the major changes in residual values of mainframe and peripheral systems. This report also analyzes and forecasts IBM's hardware and software directions.

- Data Administration: Experiences and Outlook, June 1984.

  - Provides a basis for developing a data administration strategy. This report includes a theoretical basis as well as practical recommendations for incorporating data administration into the strategic fiber of a corporation.

- Executive Workstation Acceptance: Problems and Outlook, April 1984.

  - Defines executive workstations and projects their role in executive and corporate computing.

- Integrating Systems and Corporate Planning, March 1984.

  - Describes approaches for achieving an integrated information systems and corporate business plan and achieving full benefits from information technology.

- Large-Scale System Directions: Disk, Tape, and Printer Systems, March 1984.

  - Provides an overview of directions in the disk, tape, and printer technologies and projects residual values of selected IBM disk, tape, and printer systems.

- Annual Information Systems Planning Report 1983, December 1983.

  - Describes major events and projects trends in the hardware, software, and communications industries.